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Published by The Penton Publishing Co., Penton Building, Cleveland, Ohio. John A. Penton, Chairman of Board; E. L. Shaner, President and Treasurer; J. R. Dawley and G. O. Hays, Vice Presidents; F.G. Steinebach, Secretary.
Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.
Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.
Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.
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STEEL

ESTABLISHED 1882

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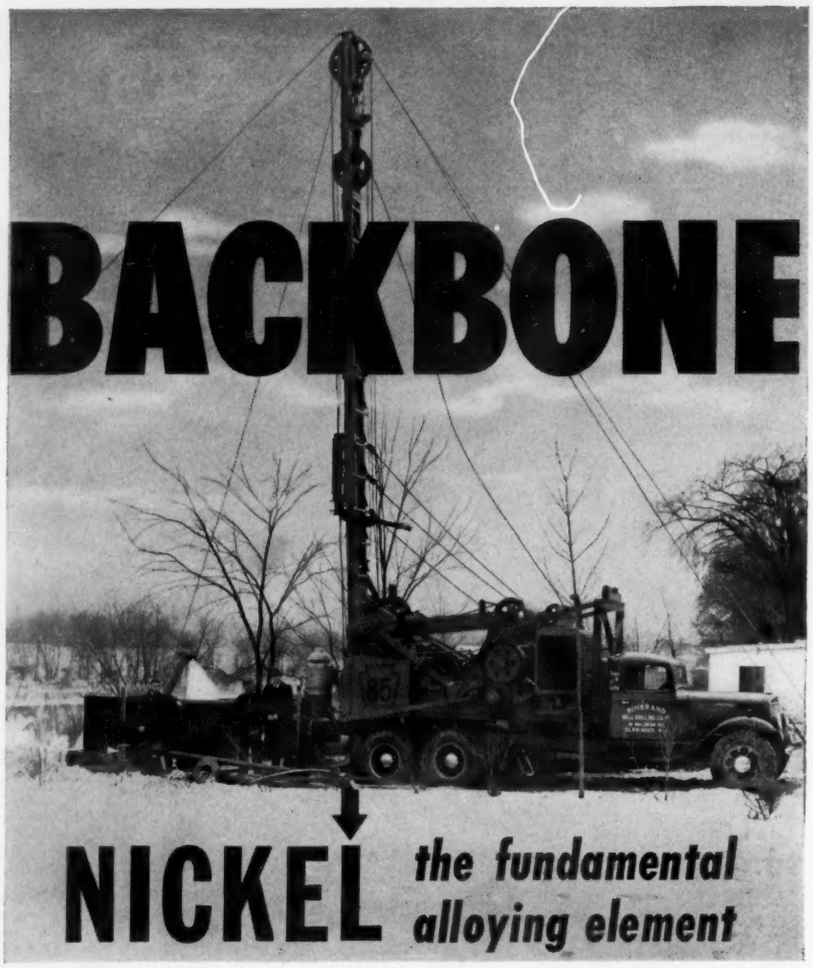
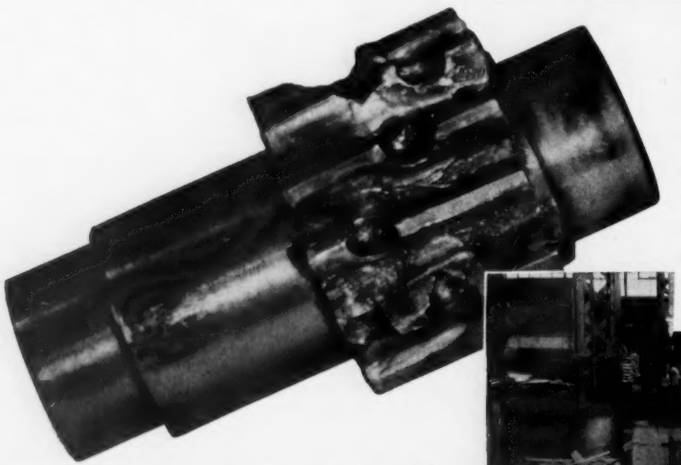
PRODUCTION · PROCESSING · DISTRIBUTION · USE

Gives steel MORE BACKBONE

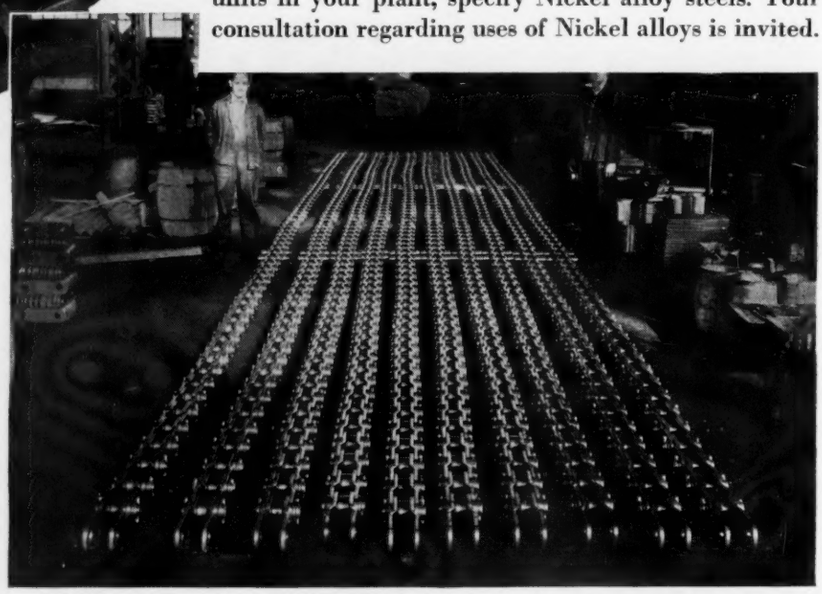


Rapid, repeated raising and dropping a 3,000 ft. string of drilling tools puts terrific shock stress and fatigue strains on portable drill rigs. This Keystone spudder uses Nickel alloy steels for transmission shafts and other vital parts. Nickel alloy steel shafts in this equipment have failure-free records of more than three years' service. Plain carbon steels, previously used for shafts, often failed in three to four months. Adding Nickel — the fundamental alloying element—to irons and steels guards against costly breakdowns on your equipment.



After 12 years' service in an industrial truck this Nickel alloyed gear still retained toughness and ductility. The photograph shows how it battered but did not break when balls from a shaft bearing fell between teeth of gear and pinion. The gear is heat treated SAE 3135 Nickel-chromium steel, the same alloy specified today. Nickel alloy steels have backbone to stand up under long severe service. No wonder they prove so economical on a per-year basis.

Nickel alloyed into steels and irons imparts added strength, toughness and wear resistance. Evidence is these tainter gate chains produced from Nickel alloy steel by the Goodman Mfg. Co., Chicago. 1⅞" pins showed a breaking load of 539,000 lbs. and a yield point of 431,000 lbs. These chains dare not fail for they control flood gates on Mississippi River dams. For vital units in your plant, specify Nickel alloy steels. Your consultation regarding uses of Nickel alloys is invited.



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ THE STEEL industry was too busy to celebrate Thanksgiving day in the usual manner. As a result, steel production last week (p. 21) again was at the rate of 93½ per cent of ingot capacity. Heavy operations now are assured through January (p. 79), with much additional buying still to appear. Export buying is expected to take up any slack. British and French purchasing commissions in New York (p. 15) are beginning to function. England is negotiating for 200,000 tons of ingots and semifinished steel, after closing for 750,000 to 800,000 tons of iron and steel scrap, it will buy more airplanes, machine tools, some materials. France has bought copper, airplanes. Canada has bought some steel (p. 16), will buy much more, particularly plates.

• • •

Planemakers Worried

Although its business is booming, the aircraft manufacturing industry (p. 18) is worried. Various government controls and threats discourage investment of capital in this industry at the needed rate. There is fear of new taxes which will cut too heavily into profits. Certain circles at Washington are seen as favoring nationalization of this industry for defense reasons. . . Fritz Thyssen, famous German steelmaster, cables STEEL his reason (p. 17) for fleeing Germany. . . A 6561-foot "floating" concrete bridge at Seattle (p. 29) will require more than 8000 tons of steel. . . Mr. Grace points out (p. 23) that although steel prices now are at about the same level as in 1929, average hourly earnings of Bethlehem employes have been increased by more than 30 per cent.

• • •

South Develops

Republic Steel Corp. held open house at Gadsden, Ala., Nov. 21, to celebrate completion of its program of expansion at that point. Capacities of open-hearth furnaces and sheet mills (p. 19) have been increased and the plate mill widened to produce up to 106 inches in width. . . Tennessee Products Corp. (p. 20) soon will blow in its Rockdale, Tenn., furnace on ferromanganese . . . Soviet Russia (p. 28) has placed orders in Germany for more than $50,000,000 worth of machine tools. United States continues the chief supplier of machine tools and machinery to England. . . As in the days of the World war, France and Germany are reported (p. 16) exchanging ore and coke via Belgium . . . House committee hearings of the national labor relations board (p. 26) are scheduled to begin early in December.

• • •

Shall We Expand?

At this time of greatly enlarged industrial activity, many managers ask the question: "Shall we or shall we not expand our capacity?" A machine tool executive (p. 70) makes this observation: "The best way to view an urge for expansion is to think of it as a dread disease which, if not quickly checked, will ultimately consume you. After this consideration, look at the origin of the urge for expansion. Is the growth of business competitive growth or industrial growth? Any company in a growing industry has a relatively easy decision". . . . Another low-cost method of producing stainless-clad steel by welding is available (p. 68); it allows use of mild steel welding rods to weld the backing and is claimed not to affect corrosion resistance of the weld zone.

• • •

"Cipping Alloys"

"Age hardening" being an improper designation for alloys whose physical properties can be improved by "solution" or "precipitation" heat treatment, the term "cipping alloys" (p. 56) has been suggested. . . . Induction heating, followed immediately by a water-spray quench, rapidly is gaining as a method (p. 54) for hardening inside wearing surfaces of cylinders, bearings, oil-well casings, hubs and similar parts. . . . Use of fusion welding has made it possible to design boilers that otherwise could not have existed, especially (p. 64) as modern, large-capacity units for high steam pressures and temperatures. . . . Outside air conditions and availability of low-temperature water present factors (p. 42) that must have special attention in designing a blast-furnace air-conditioning system.

E C Kreutzberg

We're Thinking of the Future, Too!

● We're heavily booked. We're making steel as fast as Inland's big, modern, efficient plants can make it.

We've even been obliged to turn down orders which were tendered to us.

Yes, we're in a "seller's market," but we've been through that before. We know that, like the proverbial rainstorm, it will end some day—"it always has."

That's why we're thinking of the future, too.

We're doing our level best to meet the urgent delivery demands of Inland customers, ever mindful of their cooperation with us through the years.

We're taking every precaution to maintain the high standard of Inland products.

We're seeking new processes, new methods, new formulae that will cut corners and reduce costs for steel users.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Allies' Steel Purchases Meager; Equipment, Planes Predominate

Record Scrap Order, 750,000 to 800,000 Tons, Issued Direct from London . . . Negotiations for 200,000 Tons Ingots, Semifinished Reported . . . Salesmen Besiege Commissions in New York

NEW YORK

■ LAST week the vanguard of the British purchasing commission moved into new offices on the eleventh floor of the Cunard building, 25 Broadway, next door to the British consulate. Even before partitions in the new offices had been completed, the commission was deluged with salesmen and sales literature offering everything from "heavy industrial equipment to ladies' dresses and paper knicknacks," as one spokesman expressed it.

In the uptown section at 610 Fifth avenue, in Rockefeller Center, the French commission was already established in the offices of the French Line, now largely vacated due to the virtual suspension of transatlantic service. These offices also were besieged by salesmen.

No large flood of orders for all types of materials was forthcoming. Salesmen calling at the British offices were told "our buyers will not arrive for another two weeks but we will be glad to have you call at that time." "Two weeks" also was the word given out to many at the French buying offices.

Systematic Purchasing Planned

Apparently the two offices plan to co-operate or at least exchange information on purchases, but due to their locations, it must be either by telephone or daily conferences.

Just how much buying will be done by the two commissions is yet to be determined. However, it is known that credits up to $7,000,000,000 are available if necessary.

Late last week it was reported that England was negotiating for 200,000 tons of ingots and semifinished and it was understood 25,000 to 30,000 tons of ingots purchased by Japan may find their way to England. However, from the outset the war has been regarded as an economic struggle and both commissions are expected to be extremely judicious in their purchasing. It is no secret that the British, especially, will depend upon the empire for supplies to the full extent of its resources.

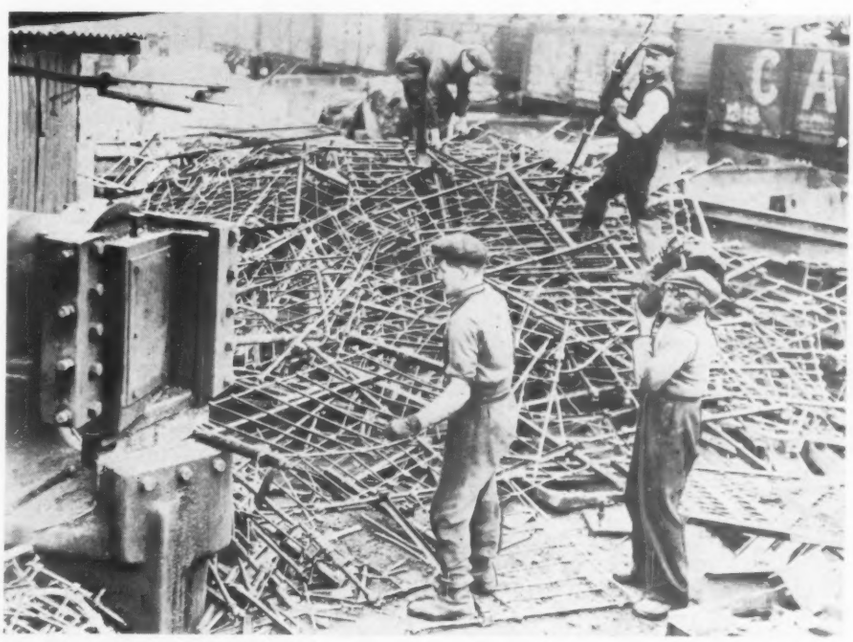
Purchases outside the empire will involve products not available or which cannot be had for sufficiently early delivery. France does not have as rich an empire and, comparatively speaking, probably will buy more than England. As an example, France placed a huge tonnage of copper, largely with American-owned companies, while Britain bought from her empire.

One of the first acts of the British commission in the United States was to place a large order for airplanes a few days ago with North American Aviation Corp. Other purchases included additional machine tools.

It is not yet clearly indicated whether the group of buyers coming over will include steel experts. In fact, according to reports here, major steel purchases will be made in London. These reports were substantiated in a measure by the purchase last week of 750,000 to 800,000 tons of iron and steel scrap through the British Iron and Steel Federation in London.

It is understood that the British buyers will work closely with the American steel export group on semifinished and finished steel, and

British Bedsteads May Become Bombs



■ Interesting as a sidelight on Great Britain's purchase of more than a half million tons of scrap in the United States last week is this recent photo of a London scrapyard, showing metal bedsteads being cut up for remelting. Caption comments on the drive that is being made for scrap in all parts of the country. NEA photo

this group is well represented in London.

The huge scrap purchase, which, incidentally, includes about 150,000 to 200,000 tons undelivered at the outbreak of the war, leads to the belief that actual finished steel purchases may be somewhat limited. Scrap may be augmented by ingots or semifinished, since it is reliably reported that shipment of a round tonnage of the former now is under way and, of course, about 100,000 tons of the latter was purchased several months ago. Most prominent in September receipts from the United States were pig iron and black sheets, with a few tons cold-finished and hot-rolled carbon bars.

According to reports in the trade, France has placed a moderate tonnage of high grade steels for early delivery. France does not appear a large prospective purchaser of steel as such, but more so in the form of manufactured products. More than anything else France probably requires coke, and large tonnages have been bought here. Like the belligerent trading of world war days, France and Germany are reported exchanging ore and coke via Belgium.

If the war drags on, according to one report, British African ores may be shipped to the United States for reduction and re-shipment to Britain in the form of pig iron. Considerable African ore, now cut off from Germany, already is moving to the United States on a direct-sale basis.

Machine Tool Purchases High

Both England and France have purchased a large amount of equipment here. In fact, these purchases have eclipsed well-publicized Russian orders for many months. As early as 1938 England bought nearly 1000 lathes and many hundreds of other types of tools, including 70 vertical boring mills, 236 thread-cutting and automatic screw machines, 302 milling machines, 137 gear cutters, about 450 drilling machines, 276 surface grinding machines and scores of other types of grinders. Buying this year has been accelerated. In September, for instance, about 450 lathes were purchased, with hundreds of other types. France also has been active but not to the same extent as Britain.

NEW RECORD SET BY BRITISH SCRAP PURCHASE

Placing of 750,000 to 800,000 gross tons of steel and iron scrap by the British Iron and Steel Federation, as referred to in the foregoing article, is believed to set a record for size. While Japan has placed orders for 300,000 to 500,000 tons at a time no such large purchases have been made in the past for European delivery.

The British Federation acted as purchasing agent for the International Scrap convention from its formation in March, 1937, handling all buying for European countries. It is understood this convention was dissolved at the beginning of the war. It seems probable the present purchase is for Great Britain's sole account, though some of the scrap may be for France under the economic arrangement recently entered into by these two countries.

As a matter of comparison with this purchase, Great Britain in the first nine months this year took 419,420 gross tons of steel and iron scrap from the United States. In all of 1938 its tonnage was 387,341; in 1937, 884,538 tons, and in 1936, 364,862 tons. Shipments to France have been negligible, 3848 tons in 1938, 3158 tons in 1937 and 622 tons in 1936. During the first nine months this year France did not import any scrap from this country.

Few Munitions Orders Released In Canada; Government Cautious

TORONTO, ONT.

■ MEMBERS of the opposition in Ottawa are presenting severe criticism of the McKenzie King government for delay in releasing contracts for war supplies and holding up vital business pertaining to Canadian and British war needs. On the other hand, the King administration appears to be holding off with the idea that the period of hostilities in Europe may not be of as long duration as the British experts expect, and does not want Canada to become too heavily involved financially if circumstances do not warrant. At all events there has been considerable delay and Canadian industrial leaders are becoming impatient.

Up to this time, it is stated that less than $100,000,000 in war contracts have been placed in this country and these orders include wearing apparel for the soldiers, and various other essentials, but do not include guns, munitions or other fighting supplies, except on a very small scale.

Earlier official reports indicate purchases for the Canadian and British governments, as the initial contracts, will run close to a billion dollars. During the past week or ten days there was some increase in war contracts placed and it is stated additional business is developing daily, but it is not expected the really big contracts will be forthcoming until the turn of the year.

The air branch appears to be receiving the most attention at this time and, according to Ottawa reports just released, a definite program will be made known shortly. Preliminary plans have been completed and the policy to be followed will be made known simultaneously in London and the capitals of the various British dominions within a week's time.

Announcement has just been made in Ottawa that an initial order for 1500 advanced training planes has been placed with a company in the United States (see page 18), and that orders for several thousand additional planes are pending. This is the first of the orders under the empire air training program and within the next 18 months awards are expected to reach a total of at least $100,000,000. It is stated that planes purchased in the United States will be flown to points near the Canadian border and there moved by tractor across the international boundary to airports in Canada and then taken by Canadian pilots to their destination either in Canada or England.

Primary steel producers in Canada are maintaining plant operations at capacity, and according to inquiries there will be no falling off in the high production schedules for some months. While mill representatives have not opened books for first quarter contracts, inquiries are appearing and bookings for the first three months of 1940 are expected to exceed those closed for last quarter this year.

Representatives of the various steel companies in Ottawa are holding conferences with the war supply board regarding supply of steel for armament and munitions requirements and it is understood that a large volume of special business will develop on this account. So far, however, only a limited amount of war business has been placed and no announcement has been forthcoming regarding contracts for shells, munitions, guns and ships.

In some quarters there appear to be doubts as to the ability of Canadian mills to supply all the war needs and also normal peace time demand for iron and steel. This question may be justified in view of

(*Please turn to Page* 96)

My Duty to My Country To Oppose Hitler, Thyssen Cables STEEL

■ OPPOSITION to Adolf Hitler and the Nazi war policy forced Fritz Thyssen, famous German steelmaster, to flee from the reich to Switzerland. This was confirmed last week by Dr. Thyssen himself in a cable to A. J. Hain, managing editor, STEEL.

The industrialist, one of Hitler's earliest supporters, was reported to have disappeared from Germany last September. Located at Locarno, Switzerland, Thyssen explained his position in reply to cabled inquiry:

"As member of the reichstag I have strongly and in right time opposed the war policy and change of general policy of the German government. It was my duty in the interest of my country to oppose the present leader. Therefore, I had to leave my country.

"I cannot tell more now, but perhaps later. I shall not retire from German industry and I shall continue to do the best for my country.

"I appreciate very much the kind feeling of my American friends.

Fritz Thyssen"

From Berlin last week came reports the vast Ruhr steel mills and other property of Thyssen have been confiscated by the Nazis.

Ranking with Krupp in the heavy German industry, Thyssen, who is now 66, was chairman of the board of the Vereinigte Stahlwerke, the Ruhr iron and steel trust, since 1928, and chairman of the Gemeinschaft, affiliated steel producers.

Supported Nazi Cause

With a small group of other Rhineland industrialists and bankers, he supported the Nazi cause in the years when it appeared hopeless. It was at the Cologne home of one of the group, Kurt von Schroeder, a banker, that Hitler and Franz von Papen reached the agreement which resulted in Hitler's being named chancellor.

After Hitler came into power, Thyssen became "leader of heavy industry" under the economic reorganization program and was appointed to the Prussian State council and the Grand Economic council.

For several years he was Germany's industrialist-statesman. So powerful was his influence with the Nazi high command that Hitler's third reich often has been called Thyssen's Germany.

In recent years the paths of Hitler and Thyssen diverged and at about the time of the present war's outbreak Thyssen's opposition to the Nazi's policy made it imperative that he leave the country. He went to Lucerne, Switzerland, and then to Locarno where he now is living with his wife and child. He states he intends to remain there "indefinitely."

Defied French

Thyssen, who inherited a fortune from his father, August, was a member of a coal mine's board of directors when he was 19. During the French occupation he was court-martialed and imprisoned for refusing to comply with French regulation of his father's steel plants.

Fritz Thyssen

The Ruhr occupation over, Fritz Thyssen succeeded his father in a vast industrial empire and steadily extended his control over the Ruhr.

This was not the old Germany, however. A revolution had swept patriarchy out of the way. Germany was a republic. The factory owner no longer was the father of his flock, but a capitalist whose power must be shorn in the interest of social justice, labor's representatives said. Factory councils now demanded a share in management.

Business was bad. The economic tornado hit Europe, steel was blown out of its place of prominence, and Thyssen's position was jeopardized.

He became an avowed enemy of socialism. He joined the Nationalist party, which was monarchist and reactionary and wanted as much as he to stamp out the reds. In the resurrection of an imperial Germany Thyssen saw a return to power and the outlawing of socialism.

Economic conditions went from bad to worse. The crash of 1931 brought German industry to the brink of bankruptcy. Thyssen found himself in a desperate situation.

It was then he embraced national socialism. He speculated on the chances of Hitler for success. The masses were turning to the Austrian spellbinder. They had tried nearly everything. Here was a new vehicle to ride toward a more prosperous Germany.

Thyssen realized Hitler knew nothing of economics. To advise him about such matters would be good business for anyone quick to grasp a golden opportunity.

Hitlerism promised to scrap the Versailles treaty. It preached defiance of former enemies. It would rearm Germany.

Thyssen rounded up his colleagues, explained what they might expect from Hitler's rule. He got together a group of capitalists who raised funds to support him. President Von Hindenburg finally yielded, and the Austrian became chancellor.

Soviet Pact Was Blow

For a period, all went as Thyssen wished. Hitler installed stalwarts of capitalism at the head of the ministry of finance, the ministry of economics and the reichsbank.

More recently the Nazis got out of control. The signing of agreements with Soviet Russia was a major blow, the destruction of much that Thyssen and his colleagues had worked for.

In 1931, Thyssen addressed an American Iron & Steel institute banquet in New York, explained conditions in the German industry. Here also he expressed his opposition to the reparations plan, termed it a destroyer of national and international economic life.

Holiday Lowers Week's Automobile Production

■ Reflecting shutdowns for the Thanksgiving holiday, automobile production for the week ended Nov. 25 dropped to 72,520, compared with 86,700 the week before, and 84,730 in the week ended Nov. 26, 1938, according to *Ward's Reports*. Chrysler remained closed.

Comparisons:

	Week ended Nov. 25	Nov. 18
General Motors	40,240	48,180
Ford	18,600	22,615
All others	13,680	15,905

New Problems Confront Nation's Fast-Stepping Aircraft Builders

■ BOOM or no boom, all is not rosy with the aircraft industry. Builders are beset with financing difficulties and obstacles in exporting, while haunted anew by the spectre of stringent government control.

Funds urgently needed for plant expansion and new equipment in some cases are not readily forthcoming from private capital. Although planemakers' earnings outlook is the best in their history, new capital is moving in with caution. Profits on federal contracts are restricted by statute, and there is ever-present the possibility of high taxes on "war profits." That capacity might eventually prove excessive also causes concern.

Preliminary steps already have been taken to clear this financial bottleneck and facilitate expansion. Aeronautical firms are to be permitted to charge off against profits on their government contracts part of the cost of special facilities required. Moreover, France and Britain in most cases have agreed to pay prices high enough to cover capacity extensions their orders necessitate.

At the same time, a New Deal group in Washington is believed anxious to see the aircraft industry nationalized for defense reasons. Already urging more regulation by the administration, they propose the government advance funds for additional production facilities either by loan or subsidy. Certain it is that fuel will be added to the fire they are kindling if private capital is not adequate.

Not yet materialized is the steady flow of warplanes from domestic plants to the allies which had been anticipated following neutrality act revision. Although huge contracts have been signed, shipment generally is being held up by state department denial of export licenses pending "further information from manufacturers as to their terms of sale to belligerents." Builders in turn are seeking a clear ruling as to what constitutes "cash-and-carry."

British Spend $24,000,000

Britain's purchasing commission in the United States last week awarded to North American Aviation Inc., Inglewood, Calif., a $24,000,000 contract for training planes. Negotiations for large numbers of reconnaissance bombers are reported underway with Lockheed Aircraft Corp., Burbank, Calif.

Neutral Sweden, Finland, Holland and Belgium also are said to be in the market for American fighting craft. Republic of China has placed with Vultee Aircraft division of Aviation Mfg. Corp., Downey, Calif., a $1,000,000 order involving an attack bomber, a set of assembly jigs and duralumin for 25 planes.

War department last week ordered from Pratt & Whitney division of United Aircraft Corp., East Hartford, Conn., airplane engines amounting to $12,834,105.

Bids now are being taken by Consolidated Aircraft Corp., San Diego, Calif., on construction of six one-story factory units costing $350,000 with equipment. Modernization plans announced by Lycoming division of Aviation Mfg. Corp., Williamsport, Pa., involve expenditure of $400,000 for new tools and machinery.

Just organized in Los Angeles with capital of $500,000 is Pacer Aircraft Co. Cobb, Campbell & Kelley, 639 South Spring street, are its representatives. Pacific Aviation Inc., Hawthorne, Calif., has filed with SEC its intention to issue $325,000 in common stock, with proceeds allotted for plant construction, working capital and equipment.

Development of new refining methods to step up production of high-octane aviation gasolines was disclosed at a recent meeting of American Petroleum institute in Chicago. While domestic consumption of aircraft fuel now approximates 20,000,000 gallons a year, capacity for producing 6,000,000,000 gallons annually is seen in these processes. It was indicated six plants now operating have 37,000,000-gallon annual capacity, with contemplated units involving an additional 125,000,000.

Stainless Steel in Swift Fighter

■ **Stainless steel finds numerous applications in this modern high-speed pursuit plane. Built by Republic Aircraft Corp., Farmingdale, N. Y., it is a type needed in large numbers by the allies. Stainless is used for its ailerons, tail assembly, exhaust manifold, firewall and ignition cables. Photo courtesy Electro Metallurgical Co., New York**

October Machine Tool Operations at 84.9%

■ Machine tool industry's operating rate continued to advance in October and stands at 84.9 per cent of estimated capacity, according to National Machine Tool Builders' association's new index. The index, which represents approximately 60 per cent of the industry's volume, is based on productive hours, expressed in percentage of an estimated total capacity of companies reporting.

October's rate compares with 74.6 per cent in September. Each month this year has shown an advance over the preceding month. January operations were 52.5 per cent.

The association discontinued in September its former index based on machine tool orders. At that time it was explained uncertainty as to the firm character of some pending business distorted the orders index, which would not have truly reflected the industry's activity.

Republic Enlarges Plant in South, Adds Wire Mesh, Bolts, Nuts to Output

By G. W. BIRDSALL
Associate Editor, STEEL

BIRMINGHAM, ALA.

■ FORMAL opening of the enlarged plant of Republic Steel Corp., Gadsden, Ala., Nov. 21, marks completion of a major development program, evidence of increased industrial requirements in the South.

Coke pig iron capacity in Alabama in 1929 was 3,223,500 gross tons against 3,200,850 at present; in Tennessee, 180,000 in 1929 and 130,500 tons now. Steel ingot and steel for castings capacity in Alabama was 2,054,700 tons ten years ago, is now 2,329,000 tons; total for Tennessee, Georgia and Florida increased from 6950 to 137,040 in the same period. Thus, while pig iron capacity changed little, that for steel increased considerably. In addition, southern mills have greatly diversified their products by addition of rolling mills and other facilities.

Adds Two Departments

With completion of its expansion program at Gadsden, Republic has increased its open-hearth capacity more than 40 per cent to 47,500 tons per month; sheet mills 28 per cent to 9000 tons per month. Its plate mill has been widened to roll plates up to 106 inches. A large bolt and nut factory has been installed, a 2-story office building erected and many other improvements made.

Republic's subsidiary, Truscon Steel Co., has installed nearby two large automatic welding machines to make wire reinforcing mesh for concrete roads and structures. Total employment has increased from 3150 to over 4000.

The formal opening was attended by R. J. Wysor, president; C. M. White, vice president in charge of operations; P. F. Boyer, comptroller, and W. J. Harper, Republic's combustion engineer. Also present were C. L. Bransford, Republic's Birmingham district manager, J. L. Hyland, Chicago district manager, and E. I. Evans, manager of the Gadsden plant, with his assistant, A. Delaney. Other guests included Judge L. L. Herzberg, Montgomery, Ala.; Joe Starnes, congressman from Alabama's fifth district; and many others.

After an extended plant inspection, a luncheon was given by Gadsden chamber of commerce in honor of Mr. Wysor and Mr. White. In tracing Republic's interest in the South over the past 80 years, Mr. Wysor pointed to the recent rapid rate of industrial expansion of this section compared with the North. Regarding the immediate outlook, he said: "It seems probable that any slackening in domestic demand after the first of the year may be taken up by export business . . . I expect activities in the steel industry to hold at good levels through the first quarter of 1940."

Open-hearth capacity at Gadsden was increased by adding two 150-ton units to make eight. This required extending open-hearth building 264 feet, adding a 7½-ton floor-charging machine and a 210-ton crane.

To accommodate increased sheet-mill capacity, that building and furnace, pickling, annealing and shipping buildings were extended, some more than 300 feet. A new heating furnace, a second pickling unit and a latest-type galvanizing machine were added, the latter delivering sheets at 150 feet per minute. Equipment to make several hundred tons a month of Republic's special roofing sheets also has been installed.

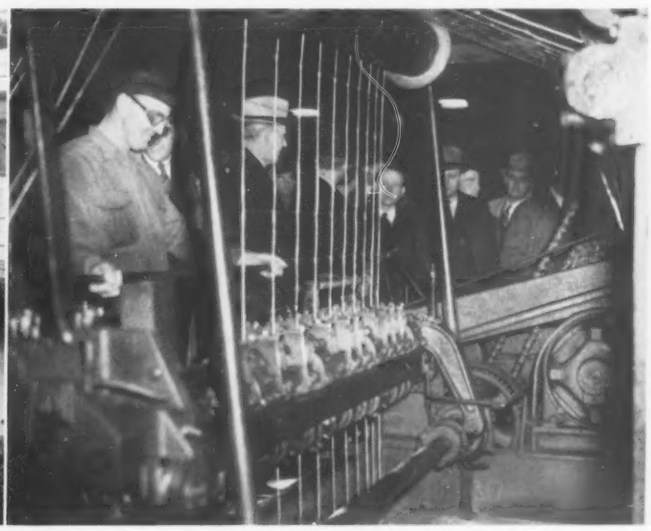
Plate mill was widened from 84 to 106 inches maximum, the building being extended two bays and an extra reheating furnace added. Plate warehouse was extended 216 feet at one end, 192 feet on the other.

Other Expansions Indicated

New bolt and nut plant has 50 machines for hot and cold forging, with capacity of 1000 tons per month. Further extensions to this department already are planned and other mill expansions were indicated by Mr. Wysor in his address.

Two things appear responsible for the improved industrial picture in the South: Definite progress in replacing cotton with other farm products to increase farm income, and a better balance between industry and agriculture obtained by introducing new industries. Neither are haphazard developments but the result of careful planning by far-sighted business and industrial leaders.

As far back as 1926, G. G. Crawford, then president of Tennessee



■ **Left, general view of building housing two new 225-foot automatic welding machines which make wire-mesh reinforcement for concrete roads and structures. Units, as shown at right, can weld either wire or rod up to ⅜-inch diameter**

Coal, Iron & Railroad Co., Birmingham, Ala., investigating the proportion of southern products sold in plant commissaries, found poor grading, improper packing and generally poor quality of home-grown products. So he started a movement to encourage diversified agriculture and better marketing methods. Today, Tennessee Coal, Iron & Railroad has a farm products division with agents in each southern state who work closely with county farm bureau agents, agricultural colleges and other agencies to help farmers find and develop markets.

As a result, 40 fruit and vegetable markets and at least 200 livestock markets with weekly auctions have been established in the past ten years. Pecans formerly sold to local buyers at 8 cents a pound, now are sold direct to northern companies at prices up to 25 cents. Eggs which flooded the market seasonally at 12 cents a dozen now are graded, held in storage and sold at 21 cents. Similarly, better marketing methods have improved returns from livestock, peanuts, syrup and other products.

Cattle Raising Important

Outstanding example of benefits from diversification is Clarksville, Tenn., for many years a one-crop tobacco community. Selling largely abroad, it saw this market crumble as other countries began to produce their own tobacco. The slump in income, however, was more than taken up by other crops advocated by the First National bank of Clarksville, resulting in considerable increase in general business. The diversification program's "Four Pillars of Income" were: Tobacco in winter, lambs in spring, grain in summer and cattle in autumn.

To show other communities how it is done, Alabama Bankers association, working with Tennessee Coal, Iron & Railroad's farm products division, organizes groups of bankers and business men to visit Clarksville and study conditions at first hand.

Diversification Pays

Diversification has increased peanut production in Alabama from 224,400,000 pounds in 1929, 265,800,000 in 1934 to 384,400,000 in 1938. Typical of increased cattle production is the Alabama wholesale meat packers' output of $5,883,443 in 1929, $5,113,759 in 1935 and $8,852,612 in 1937. In the last six years, practically all large packers have established southern plants. In eight southern states, number of cattle increased from 4,789,453 in 1930 to 7,723,623 in 1935 with an accelerated rate of increase since.

An active participant in attracting new industries to the South is Alabama Power Co., Birmingham, Ala. According to T. D. Johnson, manager of its new industries division, more than 360 new industries in over 100 localities have been added to lines of that company in Alabama alone since 1924. These involve a total capital investment of $122,000,000 and 38,000 employes making chemical, paper, rubber, metal and textile products.

The South attracts new industries because of its low-cost labor, fuel and taxes combined with a favorable attitude of bankers, local and state governments. Low living costs are a definite factor as the climate permits lower housing costs and a longer growing season. Some companies find freight an element, others nearby raw materials.

Southern pine and hardwoods can be counted on for one cord per acre per year but by modern methods as high as four may be obtained. Conservation is being given more attention, Alabama Power Co. alone setting out 1,500,000 to 2,000,000 trees yearly. A new state law requires all stock to be kept in fenced areas.

While craft paper facilities appear ample, new white-paper plants are expected, using the fine clays found here. Other important raw materials include fine silica sands for making all types of glassware; kaolins and china clays for chinaware; mica and graphite.

Birmingham district will continue to be steel center due to nearby coal, ore and limestone sources.

Abundant hydraulic power is available from nearby Tennessee valley and the series of dams near Lay dam, Ala., where 700,000 to 800,000 horsepower is available.

■ **Group inspecting new open hearths at Gadsden, left to right, Joe Starnes (pointing), congressman, Alabama fifth district; R. J. Wysor, president, Republic Steel Corp.; C. M. White, vice president in charge Republic operations; P. F. Boyer, comptroller; E. I. Edwards, manager Gadsden plant; and G. W. Birdsall, associate editor, STEEL**

Tennessee Products Corp. To Make Ferromanganese

■ Tennessee Products Corp., Nashville, Tenn., has entered the ferromanganese field, with production to begin shortly at its furnace at Rockdale, Tenn. The Rockdale plant, one of six owned and operated by the corporation in Tennessee, was acquired some time ago at a cost of $1,000,000. Heretofore the furnace has been producing ferrophosphorus.

Manganese ore has been purchased and is now enroute to the furnace. A substantial backlog of orders for ferromanganese has already been accumulated, according to Carl McFarlin, president.

The corporation produces charcoal pig iron at its Lyles, Tenn., furnace, and coke at its by-product plant in Chattanooga. It also owns and operates one of the largest commercial coal mines in the South at Whitwell, Tenn., with production about 2500 tons daily. Other products of the corporation include mineral wool.

Nothing was revealed as to source of the company's manganese ore supply, or the anticipated rate of production of ferromanganese.

MEETINGS

AGRICULTURAL ENGINEERS TO STUDY STEEL STRUCTURES

■ AMERICAN Society of Agricultural Engineers will conduct its fall meeting at the Stevens hotel, Chicago, Dec. 4-8. Subjects of interest to the steel industry will be discussed at two sessions of the farm structures division.

At the first session on the evening of Dec. 5, in connection with the topic of storage structures to meet requirements of the ever-normal granary program, R. E. Martin, chief engineer, Martin Steel Products Corp., Mansfield, O., will contribute a paper "Steel Bin Design for Farm Storage of Grain"; and W. B. Larkin, chief engineer, farm equipment division, Butler Mfg. Co., Kansas City, Mo., will speak on "Steel Grain Bins."

D. H. Malcolm, agricultural engineer, American Rolling Mill Co., Middletown, O., will address a second session of the division on the afternoon of Dec. 6 on "The Agricultural Engineer's Interest in the Small Items of Prefabricated Structural Farm Equipment."

S.A.E. ANNUAL MEETING IN DETROIT, JAN. 15-19

Twenty technical sessions, an engineering exhibit and annual dinner will feature the annual meeting of the Society of Automotive Engineers at the Book-Cadillac hotel, Detroit, Jan. 15-19. More than 2500 automotive executives and engineers are expected to attend and hear internationally acclaimed authorities reveal the latest information on automobiles, commercial vehicles, aircraft and aircraft engines, diesel engines, fuels and lubricants and allied subjects. Over 30 of the industry's leading suppliers will participate in the exhibit.

Convention Calendar

Dec. 4-5—National Industrial council. Annual meeting at Waldorf Astoria hotel, New York. Noel Sargent, 14 West Forty-ninth street, New York, is secretary.

Dec. 4-8—American Society of Mechanical Engineers. Sixtieth annual meeting at Bellevue-Stratford hotel, Philadelphia. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

Dec. 4-8—American Society of Agricultural Engineers. Fall meeting at Stevens hotel, Chicago. Raymond Olney, St. Joseph, Mich., is secretary.

Dec. 4-9—Seventeenth Exposition of Chemical Industries. Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, is manager.

Dec. 6-8—National Association of Manufacturers. Forty-fourth annual convention and Congress of American Industry at Waldorf Astoria hotel, New York. Noel Sargent, 14 West Forty-ninth street, New York, is secretary.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Nov. 25	Change	Same week 1938	Same week 1937
Pittsburgh ...	94	None	50	27
Chicago	95	+ 2	58.5	30
Eastern Pa..	86	— 1	34	27
Youngstown .	90	None	61	37
Wheeling	93	None	66	35
Cleveland	88	— 2	77	28
Buffalo	95	+ 2	53.5	21
Birmingham .	94	None	75	54
New England.	100	None	74	27
Cincinnati ...	84.5	— 4	70	29
St. Louis	81	None	48.5	20.6
Detroit	90	— 5	82	59
Average....	93.5	None	62	31.5

Oligopoly! Olismokes!

To the Editor:

"One government economist," says a news dispatch from Washington, "described the steel industry as an 'oligopoly.'"

The nearest to "oligopoly" in Webster's is "oligo," from the Greek, denoting few, little, small, a lack, deficiency.

Then there are the words "oligarchy," meaning government by a few; and "monopoly," as everyone knows, a popular game which made a fortune for a poor man during the depression.

Take "olig" from one, add "opoly" from the other, and we have what the government economist says is the steel industry.

It matters not how straight the gate—virtual control of the industry by the government these past seven years; nor, how charged with punishment the scroll—a deficit in some years and pitifully low average for the period.

After sitting in on the hearings for three weeks in Washington a cogitating government economist sums it up, in—"oligopoly."

OLISMOKES.

Cleveland

"Blue Chips" Available to Turret Lathe Operators

■ As a new service to turret lathe operators, Warner & Swasey Co., Cleveland, turret lathe manufacturer, has commenced publication of "Blue Chips." It contains four pages, illustrated with drawings and photographs, including considerable material contributed by readers, answers to questions, editorials by Bill Pelich, editor, and information on tooling technique for old and new machines.

Initial distribution is 27,000. It is to be issued monthly.

PRODUCTION

OPERATING RATE UNCHANGED AT 93.5 PER CENT

■ STEELWORKS operations last week held at 93.5 per cent, two districts showing small advances and four declines, the remaining six unchanged. Last year the rate was 62 per cent; two years ago 31.5 per cent. Practically no interruptions for Thanksgiving day were noted.

Youngstown, O.—Remained at 90 per cent with 69 open hearths and two bessemers in production. Schedule for this week is 92 per cent as Youngstown Sheet & Tube Co. will resume bessemer activity. This company's Brier Hill coke ovens started production last week, with probability another blast furnace will be blown in soon.

Cleveland—Loss of 2 points to 88 per cent resulted from one open hearth being taken off by Otis Steel Co.

Chicago—Advanced 2 points to 95 per cent on small increases by a leading producer. Five mills now are at or above theoretical capacity.

Detroit—Off 5 points to 90 per cent as three open hearths were down for short periods for roof repairs. Ford Motor Co. has nine of its ten furnaces operating full. Great Lakes Steel Corp. has one open hearth down for rebuilding.

St. Louis—Unchanged at 81 per cent, holding the best rate since late summer, 1937.

Pittsburgh—Steady at 94 per cent for third consecutive week. This is virtual capacity.

Wheeling — Continued at 93 per cent, without change since the beginning of October.

Central eastern seaboard—Down 1 point to 86 per cent, due to furnace repairs. Plants operated through Thanksgiving day.

Cincinnati—Dropped 4 points to 84.5 per cent as open hearths were taken off for repairs.

Birmingham, Ala.—Held at 94 per cent for third week with schedule for this week at same rate.

Buffalo—Gained 2 points to 95 per cent, Bethlehem Steel Co. lighting its thirtieth open hearth, to capacity.

New England — Production sustained at 100 per cent, with no interruption for Thanksgiving.

■ October shipments of electric industrial trucks and tractors reported to the bureau of the census totaled 129 units, compared with 90 in September and 42 in October, 1938. New orders were 150 in October, 99 in September. For ten months this year shipments were 787 against 721 in ten months, 1938.

What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ STEEL shipments on the Ohio river in this district hit an all-time high during October, according to the United States engineer's office here. Volume carried was 213,700 net tons, nearly one-third above the previous peak month, July, 1937, when 163,705 tons were shipped.

No longer of great interest is the fact a new tonnage record was set, because this is occurring with almost monotonous regularity lately. Important factor, however, is that other materials such as coal, coke and limestone are not now near their record highs. This indicates clearly that a larger proportion of steel is being shipped via the rivers than ever before. This despite rush deliveries today specified on so many orders, which would seem to preclude use of slow river transportation.

Unavailable is a breakdown showing exactly which products have caused the bulge in river traffic. While the largest tonnage item always is oil country tubular goods, analysis of the market for such products shows no unusual demand. In fact, drilling activity is light in the oil fields at this time. Obviously, it must be concluded other products are moving via barge lines which ordinarily do not use river transportation.

Some time ago it was freely predicted the change in the basing point system would increase use of rivers to equalize freight differentials of competing mills. Since the revision, steel tonnage has maintained a relatively better position on the rivers than have other products, and with the current upturn record tonnage is moving.

Total shipments of all products on the Ohio in this district during October were up slightly from the preceding month at 1,443,200 net tons. This is below the high of 1,461,323 tons moved in August, 1936. On the Monongahela, October steel tonnage was about the same as for September at 75,600 tons, but the total for all products at 2,456,700 net tons was below the 2,688,000 tons of March, 1937. Allegheny river shipments of all products totaled 320,000 tons, against 279,000 tons the preceding month and 427,897 in October, 1936, the all-time high.

•

New Galvanizing Line

Carnegie-Illinois Steel Corp. plans the addition of a modern galvanizing line at its Vandergrift works here. This is another move towards "streamlining" this unit, now a division of Irvin works, the corporation's Pittsburgh district sheet producer. Galvanizing equipment will be of the most recent type, especially designed to produce a tight-coated product. It will replace one of eight units now in use at Vandergrift.

Demise of another Carnegie-Illinois plant has been indicated. This is the National works at Monessen, Pa. The unit came into the corporation via American Sheet & Tinplate Co., has not operated since 1937. It is a tin plate works, annual capacity 102,000 tons of black plate and 98,700 tons of tin plate through 34 hot mills.

Announcement came in the form of a statement to the Monessen city council that the plant will never be used again and is for sale.

Thus the latest in a parade of sheet and tin mills on their way out. Most were the property of American Sheet & Tinplate. Ten units already have been abandoned, dismantled or sold, while four more now idle will probably never roll again.

Truck Lines Benefit from Brisk Steel Demand

■ **Truck lines specializing in hauling steel are benefiting from expanding industry. As an example, Hollywood Cartage Co., operating between Pittsburgh, Youngstown and Detroit, found it necessary to spend $25,000 on enlarged facilities and rolling stock to handle the increasing tonnage emanating from Pittsburgh and Youngstown mills. Three of the new tractor-trailer units which the company has just placed in service are pictured. The tractor-trucks are 95 horsepower Ford V-8s with heavy duty two-speed axles and 8:25-20 tires. The semi-trailers are specially constructed for transporting steel. These units carry from 8 to 10 tons of metal each trip**

Byers Wrought Iron Book in Second Edition

■ *Wrought Iron*, a 97-page cloth-bound book by James Aston and Edward B. Story, has been issued in a second edition by A. M. Byers Co., Pittsburgh. It covers manufacture, characteristics and applications of this product.

The first edition was issued in 1936 as a reference work for engineering organizations and has become standard engineering text in over 100 technical schools. More than 50,000 copies having been distributed. The second edition has been completely rewritten and several chapters added.

Those in the industry desiring copies may obtain them by request on their company letterheads. To others the price is $1.

Steel Towers for Night Baseball Lights

■ Eight steel towers, total weight 160 tons, will be installed at the Polo grounds, New York, to support 836 flood lights of 1500-watt capacity. Purchased by owners of the New York Giants, the lighting system is designed to introduce night baseball to New York.

Towers will be 5 feet square, 150 feet above the field, supported by steel platforms on the grandstand roofs and connected to grandstand columns. Belmont Iron Works, Philadelphia, will fabricate and erect the structures; Westinghouse Electric Supply Co., East Pittsburgh, Pa., is to install the floodlights.

Upturn Natural Recovery—Grace

■ CHIEF cause for the business upturn is "natural recovery," E. G. Grace, president, Bethlehem Steel Corp., declares in a letter to employes in the December issue of the *Bethlehem Review*, a bulletin for employes.

Mr. Grace points out the company's employment conditions are better than in any past period. Employment now exceeds 100,000; average daily wages are $7.03 and hourly rates average 91.2 cents, the highest in history.

"When we consider," he states, "that the present levels of steel prices are about the same as those existing in 1929, and also the gratifying fact that employes' average hourly earnings are over 30 per cent higher than in 1929, we have every reason to feel that it is a job well done.

Better Employment Conditions

"As a result of co-operation between your representatives and the management at the various plants, there has been a constant improvement in employment conditions."

Commenting on the condition of business, Mr. Grace observes: "The soundest and most important factor is the natural recovery after a long period of depression . . .

"It is gratifying that our products are going largely into consumption and not into inflated inventories, and that the buying movement does not represent important demand from warring countries . . . We must, however, always serve our own government for the materials it must have for national defense.

"We want peace and the kind of business that goes with peace."

Bulletin also reviews employment data on Bethlehem plants, and points out eligible hourly workers receive vacations with pay. A 23-year-old safety program has reduced accidents 81 per cent. Currently on pension rolls are 1734 persons; company has paid out $10,566,000 for pensions since plan was adopted, and effective Jan. 1, pension rates will be increased through cancelation of the 15 per cent reduction necessitated by the depression.

Collective bargaining has been in effect in company plants for 21 years, during which Bethlehem has dealt with representatives of employes under an organized system installed with federal co-operation.

"Since collective bargaining to be effective must be carried on in each plant, there is at each plant as a part of the permanent organization an officer known as the management's representative whose duty is to represent the management in negotiations with employes or their representatives on questions having to do with wages, hours and working conditions that shall not have been satisfactorily settled by the foreman or immediate superior."

CHAIN BELT'S EMPLOYES AGAINST CIO UNION

Employes of Chain Belt Co., Milwaukee, voted against the Amalgamated Iron, Steel and Tin Workers' union (CIO) as their sole collective bargaining representative, 406 to 356. A company petition previously filed with the national labor relations board, asking that separate balloting be held in each of its five plants was denied, the board ruling in favor of one election for all. Frederick P. Mett, NLRB attorney, supervised the election.

ESTIMATE 3,000,000 WORKERS NOW UNDER CLOSED SHOP

Closed shop agreements today cover 3,000,000 of the nation's 8,000,000 unionists, it is estimated by the bureau of labor statistics, Washington. In addition many union members work under conditions approximating the closed shop which are not formalized in writing.

Closed shop agreements require all employes in a plant or craft covered by the pact must be members of the union and that new employes be union members or join the union upon employment or within a specified time.

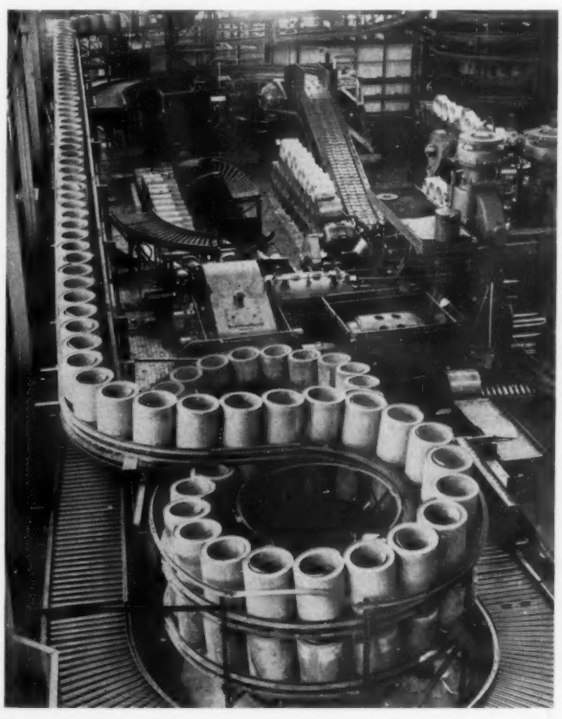
Largest single group working under closed shop is the coal mining industry, it is pointed out. Other highly organized industries in which the closed shop exists are clothing, printing, brewing, motion pictures, fur trade, millinery. Many unionized construction workers, city transport workers and employes of electrical equipment and radio industries also work under closed shop conditions.

Bureau states that much less common than closed shop is the preferential shop, which gives union members preference over nonmember employes in some aspects of employment. Although existing less frequently than closed shop in most industries, the preferential shop is prevalent in flat glass manufacture, newspaper offices, maritime transportation and longshoring.

The checkoff method of collecting union dues has been of much less concern to unions than the problem of protecting members through a closed or preferential shop. Checkoff is a great convenience to the union, and some employers are said to prefer it as avoiding confusion and loss of working time when dues are collected in or about the plant.

HARNISCHFEGER AND CIO UNION SIGN NEW PACT

After a series of conferences between Amalgamated Iron, Steel and Tin Workers' union (CIO) and Harnischfeger Corp., Milwaukee, a new contract was signed, providing for a 7½ per cent increase in pay during the next five months. It also provides a week's paid vacation for all employes of more than a year's service and continues the five-day, 40 hour week, seniority provisions and time and a half for overtime.



"I Reduce Hard Work!"

■ How new equipment benefits employes is brought home to Revere Copper & Brass Inc. workers in a series of "Know Your Company" letters. Typical example: Conveyor photo in letter is captioned "I Reduce Hard Work!" Other equipment is pictured in the letters with captions and text showing how machines increase new business, safeguard workers' health and help company to meet competition

MEN OF INDUSTRY

■ WARDEN F. WILSON has resigned as Pittsburgh district manager, American Steel Foundries, to become general manager of sales, Lebanon Steel Foundry, Lebanon, Pa. Mr. Wilson has been identified with the steel casting industry since 1925. He is a member, American Society of Mechanical Engineers, Engineers Society of Western Pennsylvania, American Foundrymen's association.

Henry D. Phillips, formerly chief metallurgist and general superintendent, Dodge Steel Co., Philadelphia, has been made product engineer of Lebanon Steel Foundry. Mr. Phillips has been associated with the steel casting industry since 1928. He is a member, American Institute of Mining and Metallurgical Engineers, American Foundrymen's association, American Society for Metals and British Iron and Steel institute.

♦

John J. Rose has been appointed sales and designing engineer, Marbott Weld Co., Cleveland. Mr. Rose formerly was with Linde Air Products Co. as a service representative.

♦

Robert E. Dillon, president, Lake Erie Engineering Corp., Buffalo, manufacturer of hydraulic presses, has been elected a director, Marine Trust Co., Buffalo. Mr. Dillon's career in the manufacturing business began in 1925. As president of Lake Erie corporation, he is directing national and international affairs of the company, manufacturing a wide variety of hydraulic presses used in the metalworking, plastics, rubber, newspaper and printing fields. He is a member of the committee on public relations, National Association of Manufacturers; member of the Hydraulic Machinery Manufacturers' association, and a director in a number of business and financial firms.

♦

Nelson W. Howard has resigned as managing director, Coal Carriers Corp. Ltd., Brockville, Ont.

♦

H. Oliver West, identified with the aviation industry the past 18 years, has been appointed special assistant to the president, Boeing Aircraft Co., Seattle.

♦

Herbert George Moulton, consulting engineer, New York, has been elected president, American Institute of Mining and Metallurgical Engineers, New York, for 1940. Erle

Warden F. Wilson

John J. Rose

Robert E. Dillon

V. Daveler, vice president, Utah Copper Co., and W. M. Peirce, chief of research, New Jersey Zinc Co., have been elected vice presidents. The following new directors were also named: Holcombe J. Brown, consulting engineer, Boston; Frank A. Wardlaw Jr., assistant general manager, Inspiration Copper Co., Inspiration, Ariz., and Felix E. Wormser, secretary-treasurer, Lead Industries association, New York.

♦

A. H. Lauer is now assistant works manager, and J. Morrison, works engineer, at the Granite City, Ill., works of American Steel Foundries.

♦

T. Fred Bailey, formerly comptroller, Oliver Farm Equipment Co., Chicago, has been named secretary and treasurer, Davenport Machine & Foundry Co., Davenport, Iowa, succeeding M. N. Forkner, resigned.

♦

James L. Brown, president and an organizer of the Trailer Coach Manufacturers association, has been named manager, trailer division, Hayes Body Corp., Grand Rapids, Mich.

♦

A. W. Pride has been appointed manager of Westinghouse Electric & Mfg. Co.'s porcelain department at Emeryville, Calif. Mr. Pride will continue as sales manager of the Emeryville transformer department.

♦

James C. Baxter, for several years identified with the Cleveland district sales office of Pittsburgh Crucible Steel Co., has resigned to become associated with the Ohio Paper Products Co., Massillon, O., in a sales capacity.

♦

Frank J. Leahy, the past two years in charge of publicity and public relations at Bethlehem Steel Co.'s Fore River shipbuilding works, has been made management's special representative in charge of industrial relations, personnel and publicity.

♦

James T. Barnard has been appointed to the sales staff of Pittsburgh Crucible Steel Co., 747 Terminal Tower, Cleveland. Mr. Barnard for several years has been in the operating department at Midland, Pa., and in the general sales office in Pittsburgh.

♦

Joseph A. Siegel has joined Leland Gifford Co., Worcester, Mass., as sales engineer covering Michigan, northern Ohio and adjacent Indiana territory. He formerly was assistant chief tool designer, Packard Motor Car Co., Detroit, and first president, American Society of Tool Engineers.

♦

Israel Citron, Citron-Byer Co., Trenton, N. J., has been elected president, New Jersey chapter, Institute of Scrap Iron and Steel Inc., succeeding Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., retired. Abraham Isaac, Elizabeth, N. J., has been re-elected honorary president. Other officers are: First vice presi-

dent, Irving I. Werblin, Werblin Bros., Somerville, N. J.; second vice president, Harry Wische, Lowenstein Bros. Inc., Newark, N. J.; third vice president, P. Feldman & Sons Inc., Elizabeth, N. J.; treasurer, Elie Bussell, Plainfield Iron & Metal Co., Plainfield, N. J.; secretary, (re-elected) Murray Kunin, Schiavone-Bonomo Corp., Jersey City, N. J.

♦

Arthur Purmort and Nathaniel Ware have been named representatives for Hewitt Rubber Corp., Buffalo. Mr. Purmort will cover the St. Louis and Indianapolis territories, and Mr. Ware has been assigned to the Boston office, assisting distributors in New England.

♦

A. L. McCarthy, since 1919 vice president in charge of sales, Eureka Vacuum Cleaner Co., Detroit, has resigned to become manager of branch and resale operations of Bendix Home Appliances Inc., South Bend, Ind.

♦

Cited as "occupying a place of the first order in modern chemistry," Dr. Vladimir N. Ipatieff, Russian scientist who came to this country in 1931, has been awarded the 1940 Willard Gibbs medal of the Chicago section, American Chemical society.

♦

Monroe Messinger has been named assistant manager and purchasing agent, Federated Metals division at Detroit, American Smelting & Refining Co. He succeeds Carl J. Gross, who has been transferred to the Whiting, Ind., division in a similar capacity. Charles Goldberg, with the Detroit division eight years, will assist Mr. Messinger.

♦

J. F. Tait, associated with Bucyrus-Erie Co., South Milwaukee, Wis., 22 years, recently as assistant manager for the eastern sales district, with headquarters in Philadelphia, has been named manager of the company's Pittsburgh sales district. He succeeds P. B. Heisey, who has resigned to enter business for himself.

♦

Don L. Winchell has become a research engineer, Battelle Memorial institute, Columbus, O. A graduate of Denison university, Mr. Winchell previously was employed in metallurgical work at the Canton and Massillon, O., works of Republic Steel Corp. and as a research assistant with Timken Steel & Tube Co.

♦

J. B. Spotswood, who will resign Nov. 30 as branch operating manager, United States Rubber Co., Chicago, plans to retire from active business and take up residence on his farm in Virginia. Succeeding Mr. Spotswood will be W. J. Laliberte, branch operating manager at Kansas City, Mo.; C. A. Gray, branch operating manager at Buffalo, will be transferred to Kansas City, and will be succeeded at Buffalo by H. A. Dathe.

C. S. Finegan

Who has been named assistant general manager, J. B. Beaird Corp., Shreveport, La., as noted in STEEL, Nov. 20, page 40

♦

Everette Lee De Golyer, consulting petroleum geologist of Dallas, Tex., has been awarded the Anthony F. Lucas gold medal for 1940 by the American Institute of Mining and Metallurgical Engineers, New York, in recognition of "distinguished achievement in improving the technique and practice of finding and producing petroleum.

DIED:

■ ADOLPH W. VOGT, 60, comptroller, United States Steel Corp. of New Jersey, and widely known in the field of cost accounting, of a heart attack Nov. 20 while returning to his home in Montclair, N. J. Born in Wurttemberg, Germany, Mr. Vogt came to this country at an early age and was educated in the public schools of Chicago. He was one of the few remaining officials of the Steel corporation who was with the organization at its formation in 1901. Since that time he served in important posts, becoming chairman of the corporation's cost committee in 1905. Mr. Vogt began his business career in 1894 with Illinois Steel Co, which later became a part of the Steel corporation. In 1901 he became chief statistician; was appointed assistant comptroller in 1915, and in 1936 was made comptroller.

Adolph W. Vogt

♦

Mathias F. Cunningham, 66, president, Waltham Grinding Co., Waltham, Mass., recently in that city.

♦

Charles E. Colman, 45, president and general manager, La Crosse Tractor Co., La Crosse, Wis., Nov. 12 in Milwaukee.

♦

James W. Morgan, 47, secretary-treasurer, Brainard Steel Co., Warren, O., in that city, Nov. 21. He went to Warren 17 years ago to become secretary-treasurer of the Brainard company.

♦

Clarence W. Spicer, 63, vice president, Spicer Mfg. Corp., Toledo, O., and former president, American Society of Automotive Engineers, in Miami, Fla., Nov. 21.

♦

Mrs. Harriet Fisher Andrew, 72, owner of Fisher & Norris Anvil Works, Trenton, N. J., and author and world traveler, Nov. 16. She was the first woman to gain membership in the National Association of Manufacturers.

♦

Joseph A. Wagner, for many years with the Detroit office of Brown & Sharpe Co., Providence, R. I., Nov. 18 in Chicago. He recently completed 36 years of service with Brown & Sharpe in service and sales capacities at Providence, Chicago, Cleveland and Detroit.

♦

Clement Ruegg, 59, chief diesel engineer and designer, Nordberg Mfg. Co., Milwaukee, in Milwaukee, Nov. 10. Mr. Ruegg joined Nordberg in 1916 and designed the company's first diesel engine in 1917. He was a member, American Society of Mechanical Engineers.

♦

Carl Behn, 43, vice president, American Bosch Corp., Springfield, Mass., Nov. 15. Born in Denver, Mr. Behn was well known in the automotive and diesel engine industries. He joined the American Bosch organization in 1923 and was made vice president in charge of sales in 1938. He was active in various engineering societies and in 1938 was a vice president, Society of Automotive Engineers.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ STEEL unquestionably learned one lesson from the temporary national economic committee's hearings: The fewer letters the industry writes the better off it will be.

In course of the hearings a number of letters were brought to light by department of justice officials. Some of these should have been destroyed, or never written at all. One witness, apparently unable to persuade the committee he did not mean what he said in his letters, declared when they were written he had no thought of their ever appearing before a congressional committee.

Writers and recipients of letters read into the record were in several cases entirely unable to give any conclusive explanation.

TNEC's investigation is costing the industry more than a million dollars, it has been estimated by steelmen. In one instance alone preparatory expense is said to have exceeded $800,000.

A. H. Feller, who presented the case for department of justice, at no time showed malice toward the industry, and his attitude was refreshing in its variance from that usually displayed towards steel by officials of the federal trade commission.

Representatives of steel producers who attended hearings express the opinion they have accomplished a great deal for the industry by way of "self-analysis." Not only is this beneficial from the standpoint of public relations, but it should be helpful to the industry itself. It is believed no testimony developed at the hearings was harmful to the industry, while at the same time government officials received a liberal education in the problems which confront steelmakers.

One New Deal economist with a "passion for anonymity" last week attacked steel as a result of the hearings. Intimating a monopoly in the industry, he suggested strengthening of the Sherman antitrust law. No one, however, took the blast seriously.

Price hearings will be opened by TNEC Dec. 4. While no official announcement has been made, it is reported officials from the commerce and labor departments as well as trade association executives and businessmen will be heard.

TO FILE SUPREME COURT WRIT IN STEEL WAGE CASE

Justice department officials will file writ of certiorari in United States Supreme Court within the next few days in connection with the Walsh-Healey steel wage case.

It will be recalled in this case the court of appeals of District of Columbia upheld a group of small steel companies in their contentions against the secretary of labor's wage decision. There is every indication the case will drag along in the courts, but in the meantime a restraining order prevents enforcement of the wage minima by department of labor.

ROOSEVELT WILL SEEK MORE MONEY FOR DEFENSE

Deficiency appropriation of $271,000,000 for the nation's armed forces will be asked by the President in January. Funds are needed during the present fiscal year to finance various activities arising from the European war.

Representative Taylor, chairman of the house appropriations committee, already has been approached. Of the total the navy will use $146,000,000, the army approximately $119,000,000.

Navy's share among other things would involve the cost of neutrality control, including the recommissioning of 70 destroyers idle since the World war as well as the addition of 29,000 sailors. The army's share is to be used for the enlistment of 17,000 soldiers and the training of several streamlined divisions in the south and northwest during the winter.

NLRB PROBE TO OPEN EARLY IN DECEMBER

Special house committee appointed to investigate the administration of national labor relations act by the labor board is expected to begin hearings early next month.

Committee's staff has been conducting extensive preparatory correspondence and assembling data which will be the basis for the investigation. Sought is specific evidence of infractions of the act alleged to have been committed by the board.

Resolution calling for appointment of this committee by the speaker provided findings should be presented at the January session of congress. It does not specifically require the committee to recommend legislation, but it is understood its findings will be the basis for legislative proposals.

Some members of the committee are not in sympathy with NLRB and it is believed this probe will be no whitewash for the board.

NEW TRADE PACT WITH VENEZUELA

Conclusion of a trade agreement between this country and Venezuela has been proclaimed by the President.

Assurance was obtained in the agreement that existing customs treatment will be maintained on American exports to Venezuela of galvanized sheets, tin plate and filing cabinets. Trade in these three items last year amounted to about $625,000.

SLOW-DOWN CONDEMNED BY CHAMBER OF COMMERCE

Branding the "slow-down" a direct descendant of the sit-down strike, United States Chamber of Com-

1 PART
INSTEAD OF
2 PARTS
Saves ONE HALF
ON ASSEMBLY COSTS
Speed Nut System
(PATENTED)
Replaces Threaded Nuts and Lock Washers
SPEED NUTS are manufactured from high carbon spring steel and heat treated to provide positive holding power for the life of the product. Made for most standard sizes of machine screws, stove bolts, metal screws, metal rivets and plastic studs. Many special shapes and sizes also developed for mass production products. Write for samples today, stating sizes desired and nature of application.
SPEED NUT DIVISION
TINNERMAN STOVE & RANGE CO.
2039 FULTON ROAD, CLEVELAND, OHIO
Manufacturers of Patented SPEED NUTS
In Canada, Wallace Barnes Co., Ltd., Hamilton, Ontario
In England, Simmonds Aerocessories, Ltd., London

merce declares both are unlawful.

Like the sit-down, asserts the chamber, a slow-down is an organized seizure of property designed to halt production until the plant is ransomed either by ejection of the strikers or submission of management to their demands.

Both tactics had their origin in the national labor relations act and both were apparently supported under the administration of that law, it is pointed out. Slow-downs are believed to be encouraged by a labor board decision in 1938 ordering reinstatement of employes discharged for causing others to stop work ahead of time in order to throw operations into confusion.

Slow-Down Is "Illegal"

While sit-downs have been declared illegal and discontinued, the chamber states, the slow-down is equally unlawful, violating the same principles. "Like the sit-down, the slow-down is placed astride the orderly flow of volume production which has brought down prices and is essential to keep them down. Forced unemployment on a large scale occurs in the production stream before and after the point of stoppage at further cost to the public.

"Unless public opinion puts a speedy end to the slow-down, there may be widespread damage before judicial processes, necessarily deliberate, can give it the ultimate stamp of illegality. Workers should be protected against coercion from every source, and the processes of production should be defended in the interest of workers and public alike."

WARNS OF DEFICIENCIES IN NATION'S VITAL MINERALS

Our first attempt to purchase minerals necessary for national defense stockpiles indicates clearly the need for development of domestic resources, Senator Thomas of Utah told newsmen.

On Oct. 19, the treasury's procurement division called for offers on manganese ore. On the basis of bids submitted it was able to acquire only 30,000 tons of manganese, of which 25,000 tons were accepted from Cuba.

"At the current rate of steel production, and with most foreign sources of manganese ore cut off by the war, we face a shortage of this essential mineral," he said. "The best information available indicates that four times as much manganese ore was withdrawn from stocks during October as was brought into this country.

"To accomplish the purpose of the strategic minerals act, which authorized expenditure of $100,000,000 for defense reserves, several steps are essential. First, the bureau of mines should push ahead with its investigation of profitable sources of these minerals. Second, processes for making possible the use of low-grade ores should be investigated. The way already has been pointed by developments in Cuba. Third, restrictions on mining development by the securities and exchange commission should be lightened."

GERMANY BOOKS SOVIET MACHINE TOOL ORDER

Soviet Russia has recently placed machine tool orders in Germany totaling more than $50,000,000, according to a report of the federation of German machinery industries, the machinery division, department of commerce states. Fulfilling, in part, the recent German-Russian economic agreement, it is believed delivery is scheduled over a two year period.

Prior to the pact, German metalworking machinery exports to the Soviet Union were considerably below the 1931 record figure of $29,698,000. In only one year since had Nazi exports to the Soviet reached an important amount. In 1937 machine tool exports from Germany to Russia totaled $18,301,000. In 1938 they totaled $2,800,000, in the first half of this year $3,052,000.

With the exception of 1931 and 1937, United States has been the chief supplier of this equipment to Russia, 1938 shipments amounting to $34,690,000, an all-time high. United Kingdom machinery exports to Russia increased greatly when Britain granted the Soviet enormous credit facilities. British supply to Russia has now been cut off and the credits canceled.

United States exports to Russia for the first half of this year were down 50 per cent, due in part, to increased British sales. To what extent the halt of English shipments to Russia and the huge orders booked with German firms will affect United States machine tool exports is difficult to conjecture.

SEEK U. S. AID ON CHINESE SITUATION

Protest against opening of negotiations for a new commercial treaty with Japan before present difficulties facing Americans in Tientsin have been cleared up has been filed by the Tientsin American chamber of commerce.

Disabilities suffered by American nationals and American interests through barrier restrictions imposed by the Japanese military on movement of persons and goods to and from the British and French concessions are cited. Protest declares that despite constant and tireless representations made by the American consul general to local Japanese authorities, no satisfactory results have been obtained. It asks that strong representation be made directly to the Japanese government in Tokyo.

BRITISH METALWORKING MACHINERY IMPORTS RISE

Machine tool and metalworking machinery imports into the United Kingdom during the first eight months of this year rose 35 per cent to a total of $21,460,000 as compared with $15,926,213 for the same 1938 period, according to the machinery division, department of commerce.

United States was again chief supplier, English import figures revealing it the source of more than 59 per cent of the total, or $12,622,000 worth for the January-August period. This compares with similar imports in 1938 amounting to $8,303,000.

German machine tool shipments to England the first eight months this year totaled $4,984,000, an 11 per cent gain over the $4,474,000 in 1938. In the 1938 January-August period Germany supplied 28 per cent of the British imports of machine tools; in the same 1939 period, 23 per cent. The present war cuts off all British imports of German machines.

WALSH-HEALEY IRON, STEEL AWARDS TOTAL $765,305

During the week ended Nov. 11, the government purchased $765,305.89 worth of iron and steel products under the Walsh-Healey act as follows: National Screw & Mfg. Co., Cleveland, $9,734.12 (estimated); Widin Metal Goods Co., Garwood, N. J., $60,427.20.

Greene-Wolf Inc., Brooklyn, $16,392.90; Crane-O'Fallon Co., Denver, $36,735; Armco International Corp., Middletown, O., $11,760.96; Clayton Mark & Co., Evanston, Ill., $28,703; Allegheny Ludlum Steel Corp., Watervliet, N. Y., $40,625 (estimated); Bethlehem Steel Co., Bethlehem, Pa., $64,810.57 (estimated).

Carpenter Steel Co., Reading, Pa., $41,140 (estimated); Universal-Cyclops Steel Corp., Bridgeville, Pa., $51,145 (estimated); Bethlehem Steel Co., San Francisco, $11,697.54; Patent Scaffolding Co. Inc., Philadelphia, $11,419.20; Keystone Steel & Wire Co., Peoria, Ill., $11,788.60.

Copperweld Steel Co., Glassport, Pa., $15,663.30; Southern Pacific Co., San Francisco, $78,296.35; Metal & Thermit Corp., New York, $13,135; American Welding Co., New York, $27,924; National Tube Co., Pittsburgh, $10,094.50; Steel & Tubes Division, Republic Steel Corp., Cleveland, $197,105.52; New York Engineering Co., New York, $15,152.02; and J. M. Tull Metal & Supply Co. Inc., Atlanta, Ga., $11,556.11.

Four-Lane Floating Bridge, 6561 Feet Long, Takes Over 8000 Tons of Steel

SEATTLE

■ TWENTY-FIVE steel and concrete pontoons are under construction in two specially-built graving docks at Seattle, as units for the "world's largest floating concrete bridge," a 6561-foot span over Lake Washington.

Builders are using 8250 tons reinforcing steel in addition to substantial tonnages of structural, bolts, connectors, anchors, cables and other equipment.

A conventional steel bridge was considered impractical in view of the length of the crossing and the depth of the lake, which at some points exceeds 200 feet. Lake Washington, a large fresh water body, is subject to storms and heavy winds. Engineers conducted exhaustive tests before approving the floating, pontoon design.

Exceptional Strength Required

The steel-concrete pontoons, or barges, are 350 feet long, have 59 feet 6 inches beam. They are designed to provide a freeboard of about 7 feet. Special units will be used at the draw opening and shore approaches, each unit to be 59 x 378 feet. A movable section, to provide a 200-foot passage for vessels, will slide into one of the other barges to open the bridge.

Draft of sections will range from 7 feet 6 inches to 13 feet 6 inches.

In addition to being water-tight, exceptional strength is required in the pontoons. Specifications call for 290 pounds of reinforcing bars per cubic yard. This means 330 tons of concrete bars for each unit. Each pontoon displaces from 4500 to 4800 tons.

Outside walls and bottoms of the pontoons are 8 inches thick, while the top slab and interior walls are 6 inches in thickness. For the main horizontal layers, 1¼-inch square bars are used and for vertical construction ¾-inch square bars are specified. Steel is being supplied by Bethlehem Steel Co., Seattle.

Barge interiors are divided into water-tight compartments. Each compartment contains eight 14-foot square cells or a total of 96 cells for each pontoon.

Articulated Joints Permit Rise

Construction time in the graving docks has been averaging 15 days, including five days for curing. When completed the barge must be towed about 20 miles to the bridge site. For a distance of 4500 feet the pontoon sections will be fastened with fifty-four ¾-inch, large-end bolts. Concrete will be poured around these connections to form a rigid one-piece section.

To compensate for weight of machinery and equipment aboard the movable section, buoyance units of steel plates and angles will be welded into water-tight cells beneath the fixed sections. Articulated joints will permit a rise and fall on the lake surface not exceeding 3 feet.

Entire floating structure will be anchored in position transversely and longitudinally with steel cables and concrete or steel anchors, depending on the nature of the lake bed. Cables are attached to the pontoons by structural steel devices inside the pontoon and are adjustable.

Bridge provides a 45-foot, four-lane roadway.

✦

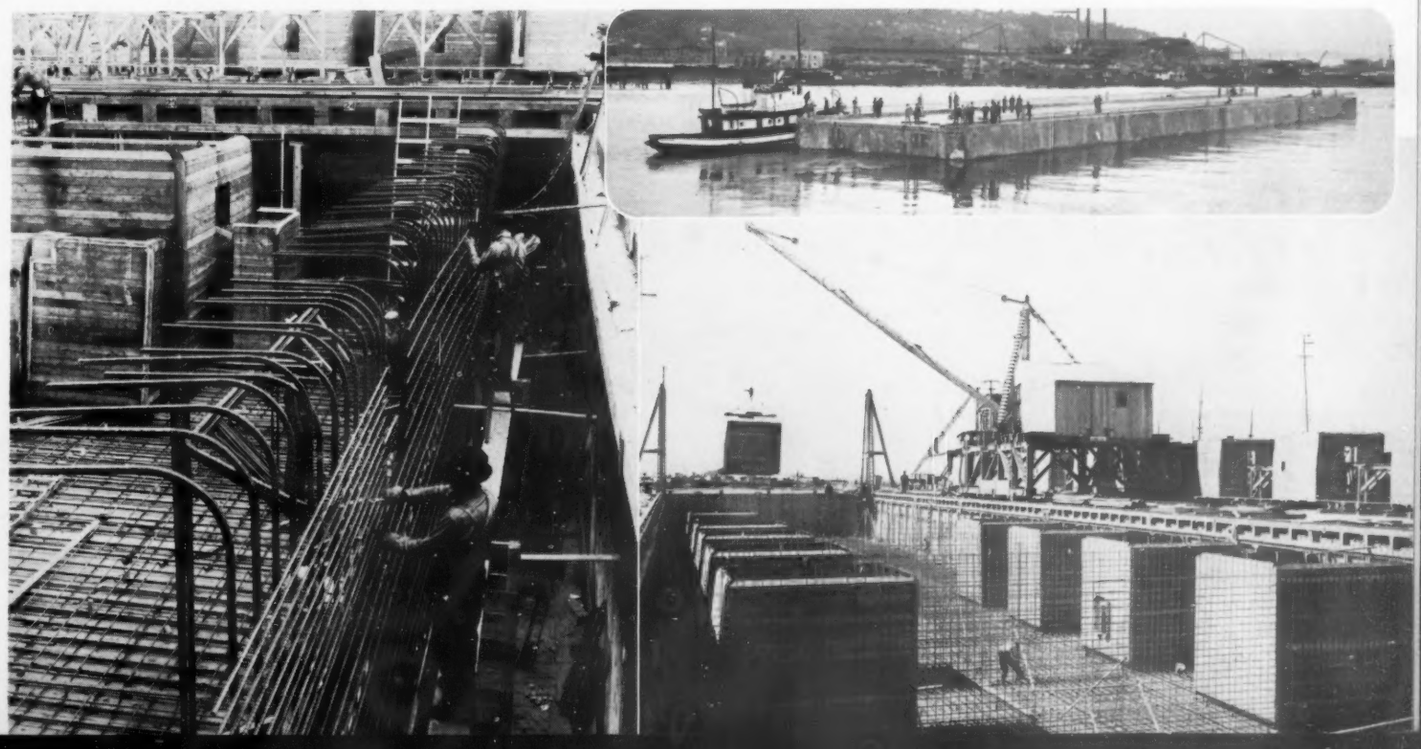
■ **Tying reinforcing steel for end wall of pontoon in graving dock, left. Lower right, placing reinforcing steel and cell forms. Inset, towing pontoon to bridge site**

Greenville Honors Chicago Bridge & Iron Officials

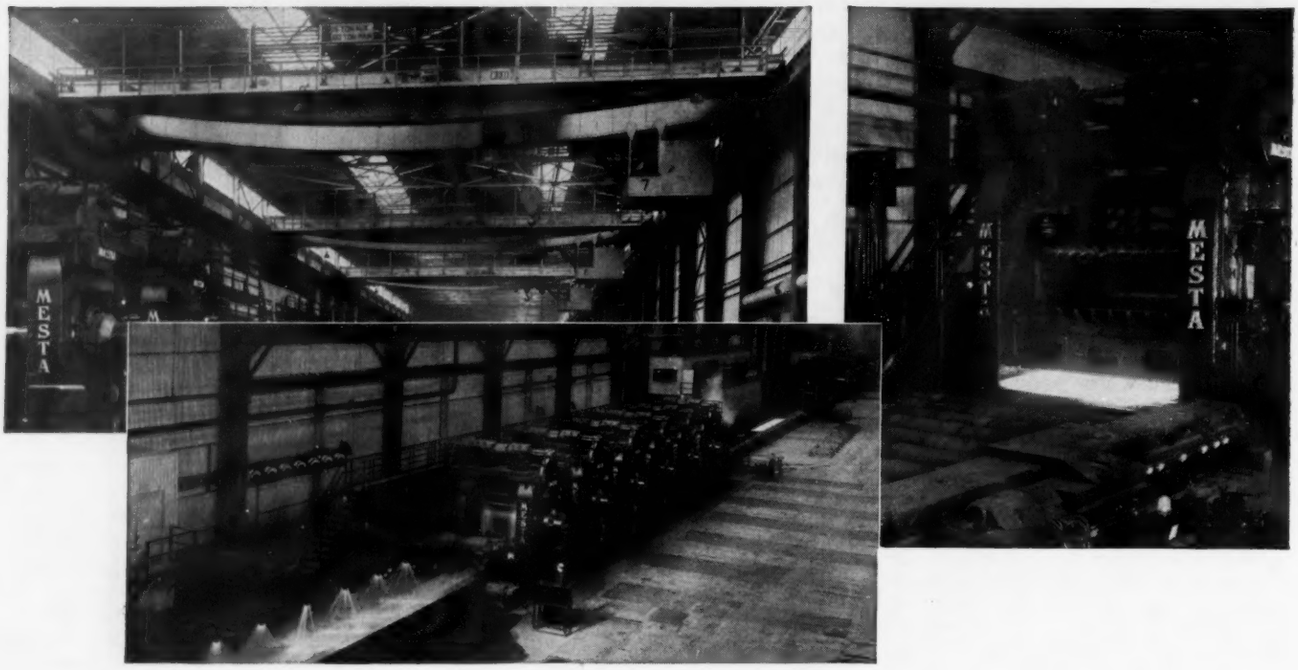
■ Executives and directors of Chicago Bridge & Iron Co. were guests of honor at a testimonial dinner tendered them recently by the Greenville, Pa., chamber of commerce, in Thiel college gymnasium. Chicago Bridge & Iron, with plants in Chicago, Birmingham, Ala., Ft. Erie, Ont., and Greenville, represents one of the major industries in the latter city.

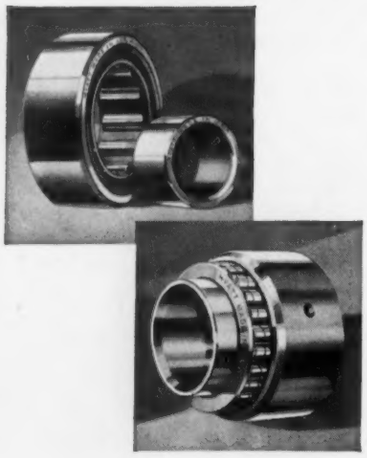
Company officials honored included George T. Horton, president; Merle J. Trees, vice president; Horace B. Horton, treasurer; C. S. Pillsbury, operations manager; H. C. Brown, director; S. A. Poyer, secretary, all of Chicago, and Mark S. Cady, Greenville plant manager. Industrial leaders from Chicago, New York, Cleveland, Pittsburgh and Youngstown, O., attended.

■ World stocks of tin increased 7560 gross tons during October, from 39,001 to 46,561 tons, according to the International Tin Research and Development council, in a cable to the American Iron and Steel institute.



SERVING AND SAVING
YEAR AFTER YEAR





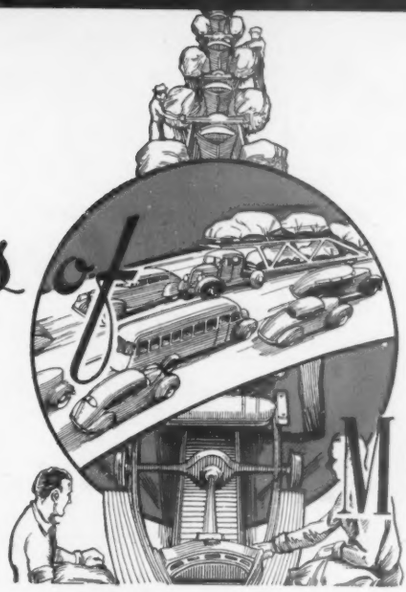
● Just as we so successfully have served others, so, too, are we ready to serve you. Say when, and where!

In mill after mill, year after year, Hyatt Roller Bearings are being applied as new equipment and as change-overs. From the newest strip mills to the renovations in existing serviceable equipment, you will find Hyatts serving and saving.

Tables, cranes, motors, hoists, shears and cars everywhere, operating on Hyatt Roller Bearings . . . giving that kind of dependable performance which you would expect from such sturdy bearings. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT *Roller* BEARINGS

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ FLURRY in aviation manufacturing circles, occasioned by demand for planes and engines for foreign accounts plus enhanced needs of this nation's military branches, is being reflected in many ways here. Last week mention was made of the equipment buying organization set up to purchase machinery and tools for the Ford plant in France, now embarking on a program of engine manufacture.

Local architects and engineers are working nights on plans for a number of new plants, airplane bases, buildings for the navy department and the like. Local contractors are participating in the erection of some of these projects, such as the Curtiss-Wright expansion at Buffalo.

New ideas in engine design, some of them on inventors' and designers' shelves for years, are being dusted off and freshened up for inspection by foreign agents and others in the aircraft field. Some of these new conceptions probably will provide the come-on for elaborate stock-selling schemes.

Promoters are being lured by the tempting bait of millions of dollars which European countries are said to be anxiously trying to spend in this country. Stories are told of phoney "special agents" of these buyers, completely equipped with foreign accent, proper dress and manners, being used to impress prospective investors.

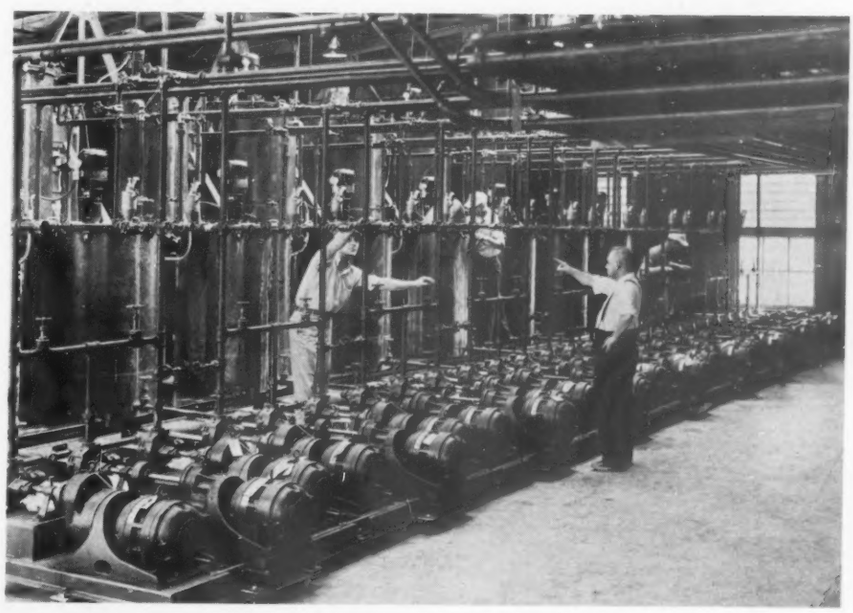
Despite such rigamaroles, there are a few new engine projects which may bear fruit. One is being studied experimentally here by Briggs which so far is reported to have spent several hundred thousands of dollars on investigational work, maintaining a staff of a dozen or so continuously. The engine is a British design known as the Aspen and features light weight per horsepower—around one-half pound—with high speed and good economy.

It is said to be a radial-type engine with a revolving cone-shaped head, gear or chain driven, which registers over intake and exhaust ports. A small unit has been built up for tests in a new dynamometer laboratory.

Another light weight-per-horsepower engine being studied here is the Holmes barrel-type unit which seems to have possibilities in aircraft usage. A third is a new design being promoted by race driver Harry Miller.

There is always the chance of a new engine design being applicable to automobile construction, many engineers holding to the belief present engines are too heavy. Ford is known to have been studying intensely the matter of cutting weight from the V-8 engine. Naturally, the light alloy suppliers are pushing the products vociferously and extolling the merits of eliminating dead weight both from engines and chassis. Advantage of weight reduction, in aircraft especially, is seen in the new Ranger engine developed for training planes being built for the government in the East. The engine weighs a little

Piping Colors to the Spray Booth



■ **Headquarters for dispatching various colors of paint to the Packard body plant has been relocated and re-equipped. Here are shown paint mixing and storage tanks in the background, with motors and pumps in the foreground for forcing the different colors through individual pipelines to spray booths**

less than 1.2 pounds per horsepower, and even this slight reduction from the best previously obtainable permitted a $600 reduction in the cost of the plane.

■ THANKSGIVING day was a wry one for most of the 58,000 Chrysler employes who have had to weather nearly seven weeks of payless paydays while the UAW-CIO has attempted to wrangle a new contract with the management. As was expected, the union has been forced to back down from practically every original demand it made and the result likely will be a contract substantially the same as that in force for two years. A hollow victory—and at what a cost!

Figure 30 days of wages for 58,000 men at an average of $7 a day, which is probably low, and you arrive at a total of $12,180,000 which workmen never will regain. Add another million in wages lost by Briggs workmen and you have struck a vital blow at a community like Detroit which obviously feels keenly the withdrawal of fourteen million dollars from circulation.

Shareholders Suffer in Tieup

If you are a Chrysler stockholder, you are probably figuring the loss to the corporation. Seven weeks of production which had been averaging 22,000 cars weekly, at a wholesale value of perhaps $500 each, means $77,000,000 in net sales which Chrysler will never realize. Out of this is about a $25,000,000 kick in the pants for materials and parts suppliers which they, too, will never retrieve. It is entirely conceivable the UAW-CIO strike at Chrysler may have broken the bubble of industrial activity which this fall appeared to be expanding to the best proportions in many years.

It is strange the far-reaching effects of a labor tieup of this magnitude. An engineer here reports receiving a letter from a grape grower in California stating he was going to be unable to ship his usual consignment of grapes into Michigan this year because of dwindling demand occasioned by the strike.

Plight of Chrysler dealers has been emphasized by a series of advertisements in newspapers calling on workmen to return to their jobs to save dealer organizations from collapse. While these are unquestionably sincere pleas, and not sponsored by the company, either, dealers of course still have their repair and service business which recent statistics have proved to be more profitable than either new or used car selling.

■ FABRICATION of Carboloy parts—tubing, spirals and round or shaped bars—by the extrusion process has been perfected by the Carboloy Co. here and while the possible outlets for parts so formed are still a little hazy in the minds of company sales officials, still the achievement of George Taylor, metallurgist, is hailed as a notable advance in the handling of this wear-resistant material.

Hitherto, shapes and sizes which could be produced have been limited by the size of the mold which it was practicable to employ to compress metallic powders into adhesive bodies, and to the fact only a one-directional pressure could be effective in forming the object, since dry metallic powders do not obey laws of fluid pressure. Also, there has been a rather definite relation between transverse and lateral dimensions of the body which could be formed. For example, the length of a rod compressed in the direction of its axis could not be greater than about three times its diameter.

Now, however, these restrictions are lifted. The dry Carboloy powder is mixed with a plasticizing medium, the nature of which is a carefully guarded secret, and can then be formed by extrusion of molding into almost any shape. A significant point is that parts so processed show equal properties—strength, density, hardness and porosity—to those made by the standard cold press or hot press methods. Rods, spirals and tubes are available in lengths up to 20 inches and within a diameter range of from 0.015 to 0.375-inch. Tubing can be made as small as 0.060-inch outside diameter by 0.030-inch inside diameter.

So far, Carboloy is showing the process to no one and is content to offer the new product for what it is worth.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
9 mos.	3,954,480	1,642,520	2,570,161
Oct.	337,979	215,286	.....
Nov.	376,629	390,405	.....
Dec.	347,349	406,960	.....
Year	5,016,437	2,655,171	.....

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Oct. 21	70,114	59,860
Oct. 28	78,210	65,335
Nov. 4	82,690	75,830
Nov. 11	86,200	86,094
Nov. 18	86,700	96,735

†Comparable week.

Figures for week ended Nov. 25 will be found on page 17.

■ ONSET of cold weather makes particularly timely Hudson's announcement of an automatic temperature regulation device offered in conjunction with the regular heater. The driver sets the desired temperature by means of a thermostatic switch attached to the steering column. In operation, the switch closes an electric circuit operating a solenoid on the side of the heater case which in turn operates a mechanical spring-loaded damper in the air duct above the heater core. When the car reaches the predetermined temperature the switch and solenoid close the damper which is normally held open when the solenoid is not energized. With air circulation through the heater core stopped, the car cools and when the "control" temperature has been reached the thermostat opens the damper once more and the car is heated again.

Buick Deliveries Up 41%

Retail deliveries of Buicks in the first ten days of this month totaled 9673 units, an increase of 41 per cent over the same period of last year. Unfilled orders exceed 30,000, or about 94 per cent ahead of the same date in 1938. Used car sales for the ten-day period amounted to 11,838, well ahead of last year's total for the period but considerably below the normal 2 to 1 ratio of used-to-new car sales. Indication of the shortage of used cars is attested by these figures, bearing out the observations of local dealers.

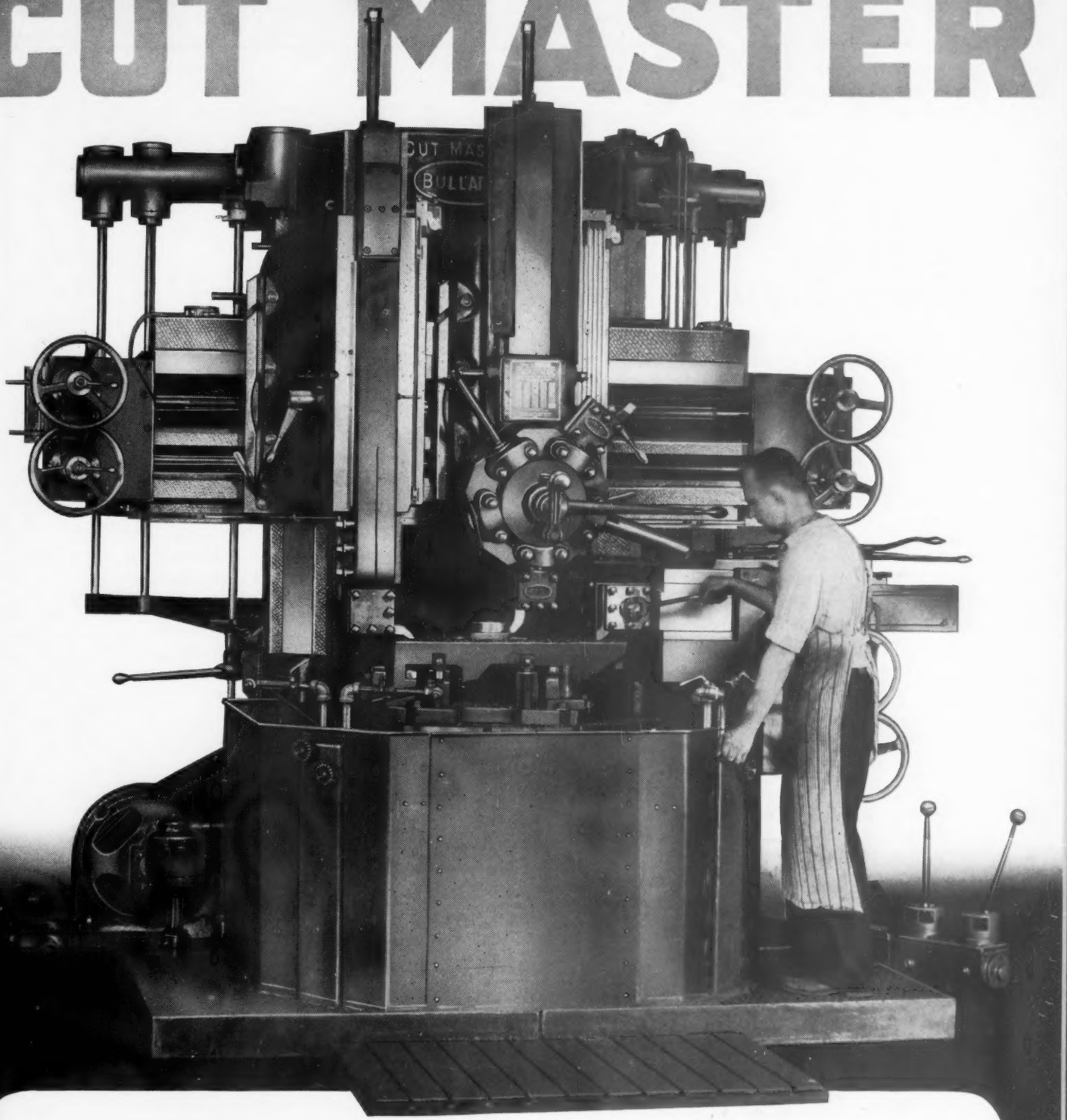
Pontiac sales for the first ten-day period of the month were ahead of last year by 48.1 per cent.

Willys production has grazed the 300 per week level, with 4000 men on the job at the Toledo, O., plant.

Nash new car orders are reported at a four-year peak, the 1619 units delivered in the first ten days of November better than quadrupling the 387 units sold in the same time last year. Nash appointed 52 new dealers in October.

Truck haulage of steel is expanding along with overall steel shipments to industry. One company, operating between Pittsburgh, Youngstown, O., and Detroit, has spent $25,000 on new transport equipment, including three new tractor-trailer units, the tractors being powered by 95-horsepower Ford engines and equipped with two-speed axles. Trailers, specially built for handling steel, carry from 8-10 tons per trip.

CUT MASTER



MAINTAINED ACCURACY

The Timken roller bearing main spindle of the Cut Master machines is only one of the numerous design factors which contribute to the maintained accuracy of these powerful new Vertical Turret Lathes.

Get specifications and data and compare these machines with others of their type. Know the reasons for accuracy, speed, versatility, and low maintenance costs. It's worth your time to make a study and save time. Write for the full story of this remarkable machine.

CUT MASTERS ARE SUPPLIED IN 30″, 36″, 42″, 54″, AND 64″ SIZES.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Editorial

Heavy Future Buying Not Warranted

■ REPLIES to STEEL'S questionnaire showed (STEEL, Nov. 20, p. 23) that inventories of steel on hand at consuming plants on Oct. 31, two months after war started in Europe, were 12.2 per cent higher than on Aug. 31. Seventy-six per cent of the consumers on Oct. 31 estimated that their steel inventories would last anywhere from a few days to three months at the existing or anticipated rate of consumption. Most who wrote under the head of "remarks" signified that large tonnages still are undelivered, also that a large number have bought against anticipated requirements until the end of the first quarter.

On the whole, based on the present and anticipated rate of consumption, this inventory condition appears reassuring. It only remains to be seen whether consumption will be maintained at the present or a higher rate. If it is, then current inventories and those in process of being accumulated as a result of shipments the steel mills are making daily, will be no cause for worry. If the rate of consumption should drop materially, that would be something else again.

Normal Inventory Becomes a Burden When Consumption Rate Declines

What appears to be a normal and satisfactory inventory level under certain conditions easily may become a powerful depressant under others. This is borne out by what happened in 1937 and 1938. Demand, early in 1937, was stimulated not only by the prevailing high rate of consumption, but by other factors. The Ohio river floods in January and May caused some duplicate buying. The CIO strike threat caused a great many consumers to load up and, when the strike came in May, they bought much tonnage from other than their regular sources of supply, causing further duplication. The announcement that prices would be raised an average of $5 a ton, as of March 1, brought about a freshet of orders.

At that time STEEL reported that, on the basis of the existing rate of consumption, there was nothing alarming in the inventory situation. However, the consumption rate was not maintained; it dropped sharply and continuously. As it turned out, the inventories accumulated in 1937 were sufficient in a great many cases to support reduced consumption practically all through 1938. That was clearly a case of robbing tomorrow's business—and everybody suffered.

Present Indications Are for Steady Conditions in Steel Distribution

The 1937-38 lesson well may be borne in mind at this time. There seems to be very little reason at present for forward buying on a large scale. The steel mills have shown a fine disposition to take care of their "bread and butter" customers—and, considering the recent hectic conditions, complaints on this score from consumers have been surprisingly few. They have given tacit assurance that no sharp or general price increases are contemplated. And a fact that is worthy of careful attention is that steel shipments now are well above the current volume of new business—which means that considerable additional new business than now is in sight is needed from domestic or foreign sources if the present volume of steel production is to be maintained indefinitely.

This matter of building up inventories is one of concern to mills and consumers alike. All benefit from steady, rather than peak and valley, conditions.

The BUSINESS TREND

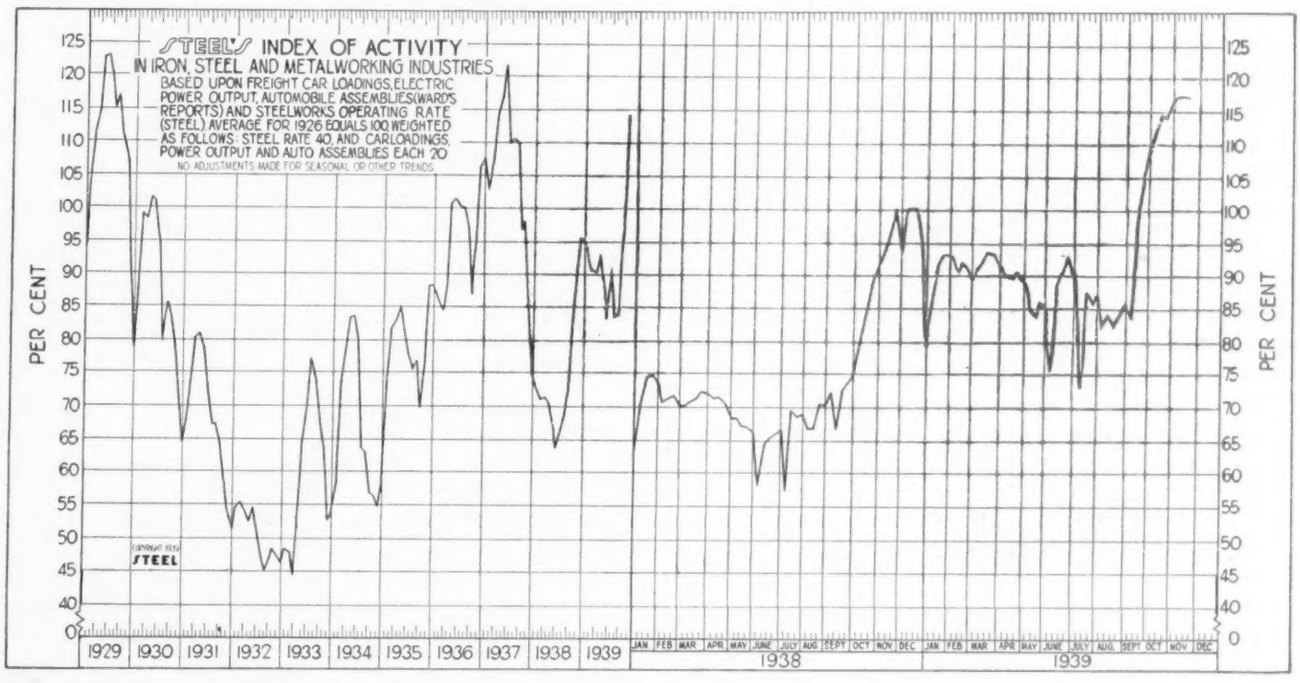
Index of Activity Moves To Still Higher Levels

■ BUSINESS activity continues on a high plane with further gains recorded by a number of industrial indicators during the past week or two. Production is at a new all-time peak in the steel industry, while output in a number of other industries has topped the 1937 levels and is nearing the 1929 peaks.

Despite small gains in three of the four business indicators from which it is composed, STEEL's index eased 0.1 point to 117.1 during the week ended. Nov. 18. A year ago the index stood at 100.4, only slightly below the 1938 peak of 100.7 recorded during the week ended Dec. 10. The index is at the highest level since the week ended May 22, 1937.

Steelmaking operations gained one-half point to 93.5 per cent during the week ended Nov. 18. A year ago the national steel rate was 63 per cent; in the corresponding week in 1937 it stood at 35 and in 1929 at 71 per cent. Order backlogs are slow to decline, despite record breaking production. Only recently have shipments begun to catch up with orders. Customers request for heavier shipments or early delivery indicates a brisk rate of steel consumption. This would suggest that steel is not being stocked to any serious extent, but rather is mostly moving promptly into consumption.

Automobile output remained virtually unchanged during the week ended Nov. 18, when assemblies totaled 86,700 units. This compares with 86,200 units assembled in the preceding week and 96,735 last year at this time.


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 0.1 point to 117.1 in the week ended Nov. 18:

Week ending	1939	1938
Sept. 2	86.3	72.3
Sept. 9	83.7	66.8
Sept. 16	97.5	72.9
Sept. 23	103.0	74.0
Sept. 30	107.9	74.9
Oct. 7	112.5	78.9
Oct. 14	113.9	84.3
Oct. 21	113.6	88.7
Oct. 28	116.2	91.4
Nov. 4	117.1	93.4
Nov. 11	117.2	95.9
Nov. 18	117.1†	100.4

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

† Preliminary.

With the exception of Chrysler plants all manufacturers are producing at what are regarded as standard output rates for the fall season. Auto retail sales during October totaled 277,158, according to Automobile Manufacturers association. This represents an increase of 82 per cent over the comparative total in October, 1938.

GAIN IN BUSINESS FAILURES NOTED

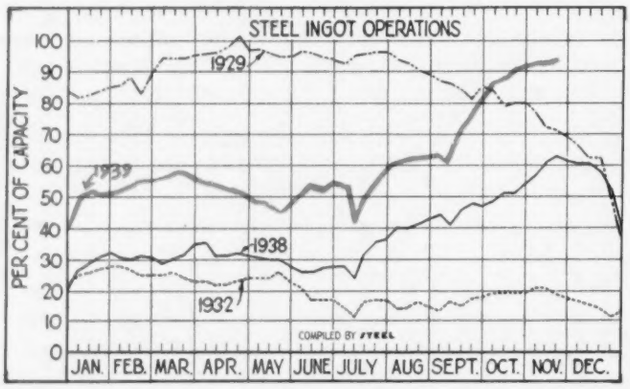
The number of commercial failures increased during October to reach the highest monthly total since May of this year. The October total of 916 disasters compares with 758 recorded during September, but remains below the October, 1938 total of 997 failures. Total liabilities during October were $16,140,000, highest since April of this year. Liabilities last month compare with $9,402,000 recorded during September and $13,219,000 in October, 1938.

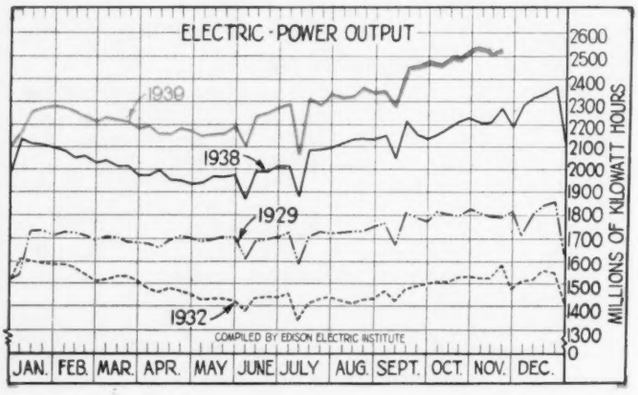
OCTOBER PRODUCTION UP SHARPLY

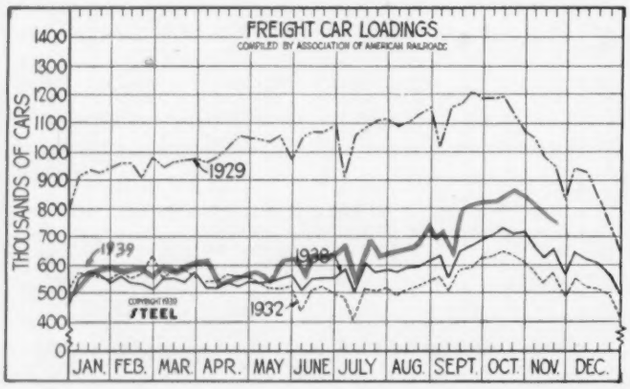
The Federal Reserve board's seasonally adjusted index of industrial production gained 9 points during October to reach the highest level since December, 1936, when the index stood at 121. The index figure of 120 recorded for October, compares with 111 reported during September and compares with October, 1938 figure of 96. Highest point reached by the index during the 1937 boomlet was 118, during March, April and May of that year. In line with the steady increase in production throughout October, the board states that employment and payrolls also recorded encouraging gains.

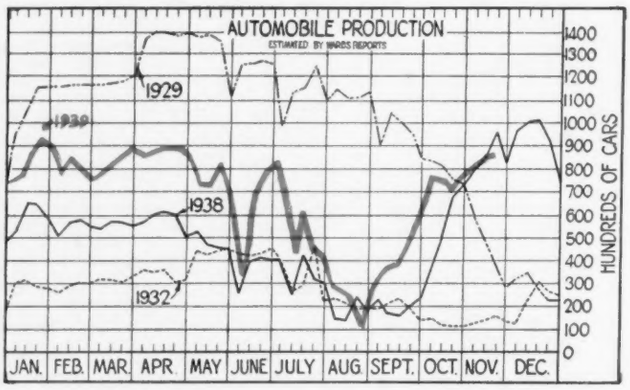
DECLINE IN CONSTRUCTION REPORTED

Total valuation of construction contract awards in the 37 eastern states as compiled by F. W. Dodge Corp. was $261,796,000 during October. This represents a decrease of 23.5 per cent from the September total of $323,227,000 and is also below the October, 1938 volume valued at $357,698,000. Declines in construction contract awards were recorded during October in all four major classifications; residential and non-residential building, public works and utilities. However, an encouraging gain was recorded in private residential construction during the month. In the first ten months this year contracts awarded were valued at $2,896,598,000, an increase of 15.5 per cent over the total awards valued at $2,505,810,000 recorded during the corresponding period last year.



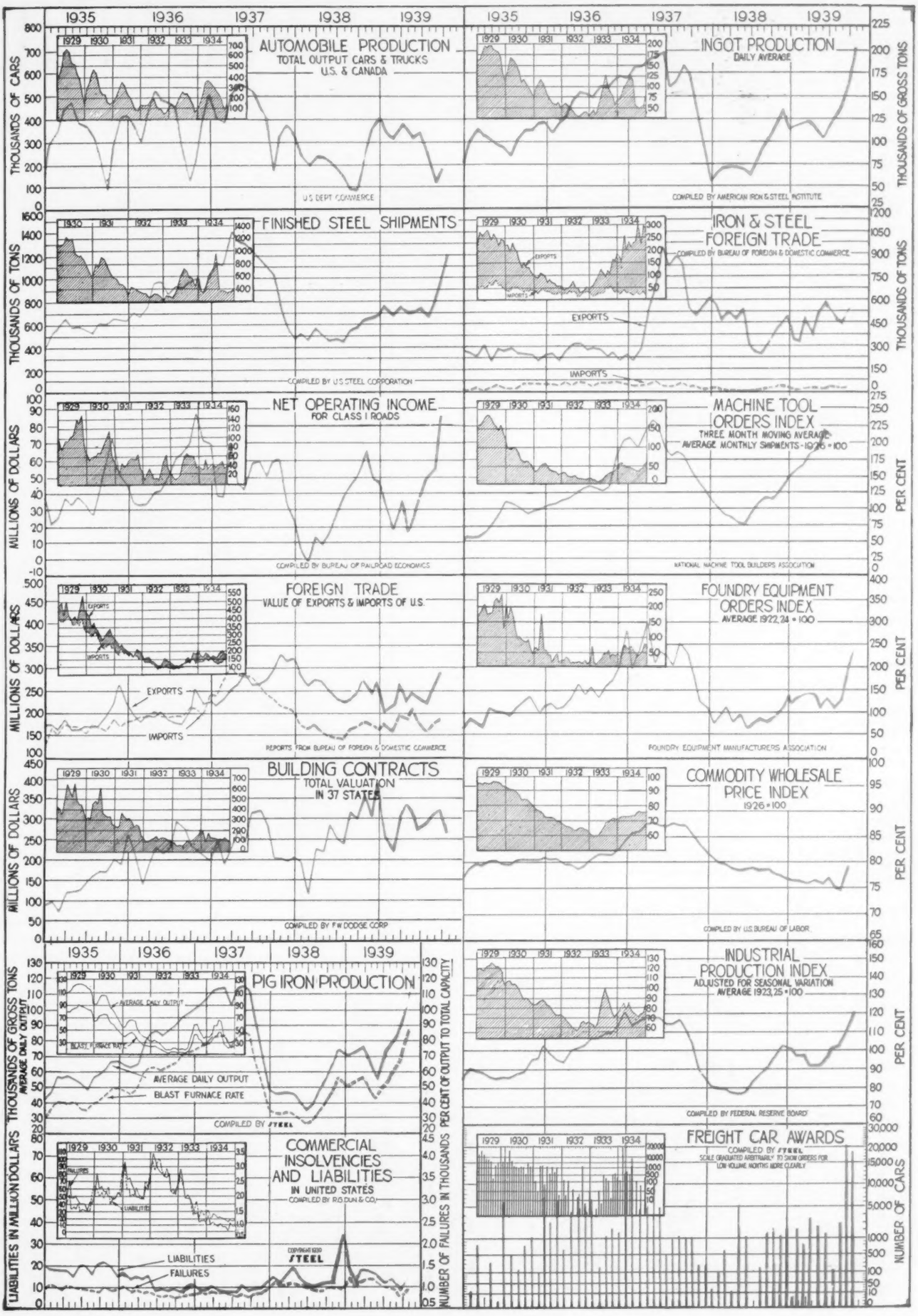






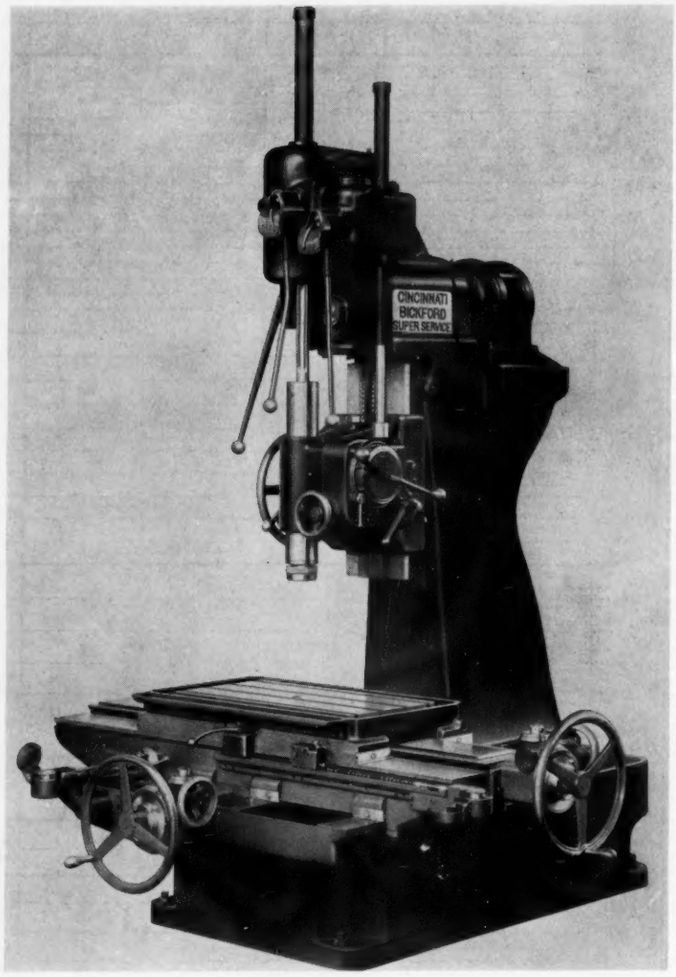
Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Aug. 5	60.0	40.0	14.5	94.0	2,325	2,116	1,426	1,730	661	584	497	1,091	28,250	14,771	23,591	114,364
Aug. 12	62.0	40.0	14.5	93.0	2,333	2,134	1,415	1,733	661	589	512	1,100	24,875	13,790	21,162	111,939
Aug. 19	63.5	41.5	15.5	90.0	2,368	2,139	1,431	1,750	674	598	518	1,136	12,955	23,940	19,568	111,902
Aug. 26	63.5	43.5	14.5	89.0	2,355	2,134	1,436	1,762	689	621	538	1,160	18,365	18,700	19,896	113,316
Sept. 2	64.0	44.5	13.5	87.5	2,357	2,149	1,464	1,675	722	648	561	1,017	25,240	22,165	19,561	90,913
Sept. 9	62.0	41.5	15.5	86.0	2,290	2,048	1,423	1,806	667	569	501	1,153	26,865	17,485	21,586	104,351
Sept. 16	74.0	46.0	15.0	84.5	2,444	2,215	1,476	1,792	806	660	587	1,166	41,245	16,100	23,116	100,042
Sept. 23	79.5	48.0	17.0	82.0	2,449	2,154	1,490	1,778	815	676	596	1,202	53,950	20,390	19,327	95,453
Sept. 30	84.0	47.0	18.0	85.0	2,470	2,139	1,499	1,819	835	698	622	1,179	62,755	25,405	13.265	83,201
Oct. 7	87.5	48.5	19.0	84.0	2,465	2,154	1,506	1,806	835†	703	625	1,179	76,095	37,665	14,568	82,088
Oct. 14	89.5	51.5	19.5	79.0	2,495	2,183	1,507	1,799	845	727	650	1,186	75,860	50,540	12,675	81,882
Oct. 21	91.0	51.5	19.5	80.0	2,494	2.214	1,528	1,824	861	706	642	1,134	70,114	59,860	11,165	76,870
Oct. 28	92.0	54.5	19.5	80.0	2,539	2,226	1,533	1,816	834	709	617	1,072	78,210	65,335	11,117	73,048
Nov. 4	93.0	57.5	21.0	77.5	2,537	2,207	1,525	1,798	805	673	587	1,050	82,690	80,030	12,257	61,824
Nov. 11	93.0	61.5	21.0	73.0	2,514	2,209	1,521	1,794	786	637	537	983	86,200	86,094	13,685	49,160
Nov. 18	93.5	63.0	19.0	71.0	2,530†	2,270	1,582	1,818	770†	657	576	950	86,700	96,735	16,497	38,219

† Preliminary.

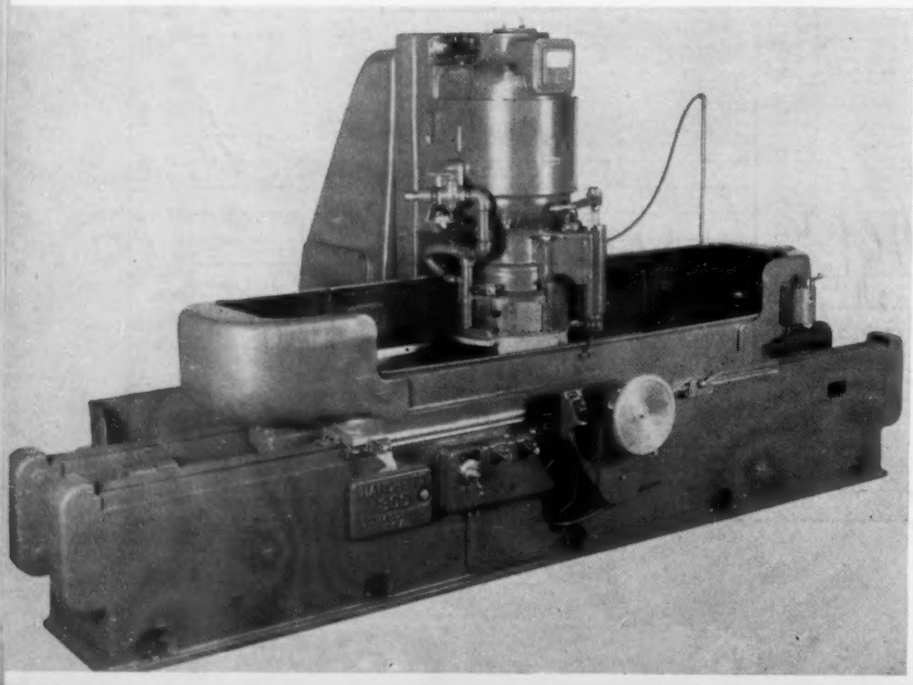

AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1925 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
THOUSANDS OF GROSS TONS
PER CENT
NUMBER OF CARS
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY
AVERAGE DAILY OUTPUT

VERSATILE

■ Continental Doall high precision surface grinder, above, with interchangeable heads, may also be used as a universal cutter grinder, as shown in two inserts. Unit motor spindle has inbuilt motor and a long support. Wheel spindle may be set on any angle up to 30 degrees. Magnetic chuck is energized with permanent magnets. Back edge of wheel cover forms a reflector which carries a 9-inch flourescent lamp. The cold light characteristic of this lamp eliminates the possibility of heating and distorting work from localized high temperature lighting. As a cutter grinder, the wheelhead has infinite planes of full circle movement. Continental Machines Inc., 1301 Washington avenue south, Minneapolis

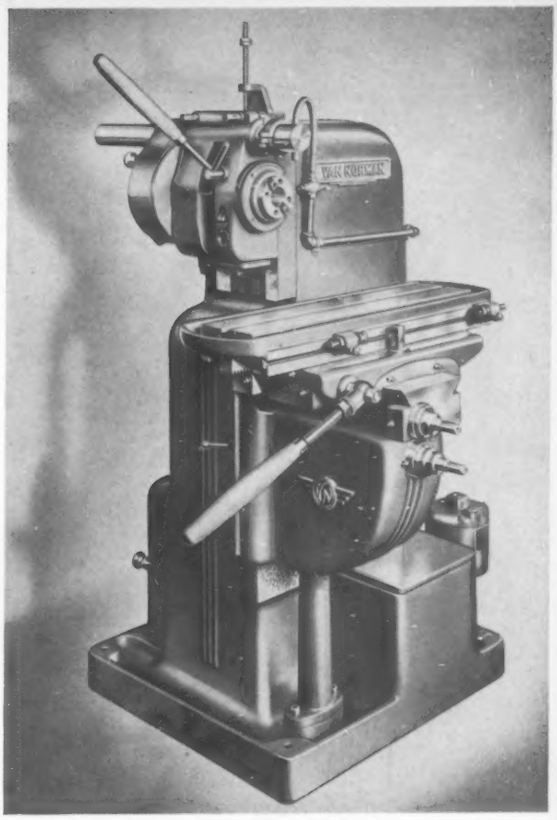


■ Cincinnati Bickford Super Service jig boring machine, above, has 12 spindle speeds obtained through sliding gears controlled by a single direct-reading lever. Nine rates of power feed from 0.002 to 0.020-inch per revolution are available. Direction of feed can be reversed without changing direction of spindle rotation. Machine has broad bearing surfaces and long narrow guides. Table never overhangs saddle and saddle never overhangs bed. Sliding head and spindle have separate counterweights. Cincinnati Bickford Tool Co., Oakley, Cincinnati

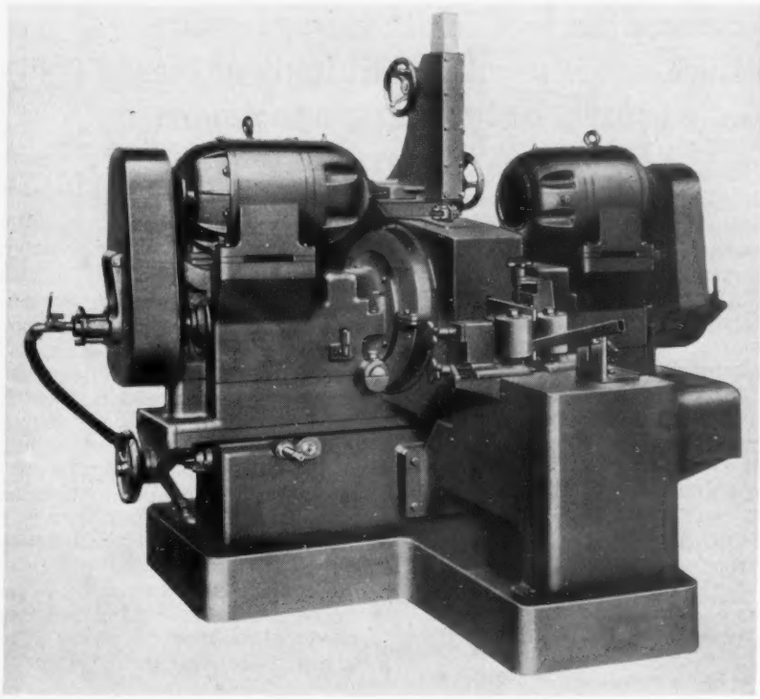


■ Hanchett reciprocating vertical spindle surface grinder, left, is suitable for both production and tool room work and has an automatic sizing attachment for production work. Table measures 13 x 50 inches. Grinding wheel is 14-inch cylinder nut inserted type. Motor for grinding wheel is rated 25 horsepower. Hanchett Mfg. Co., Big Rapids, Mich.

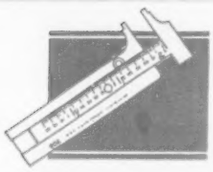
New Machines



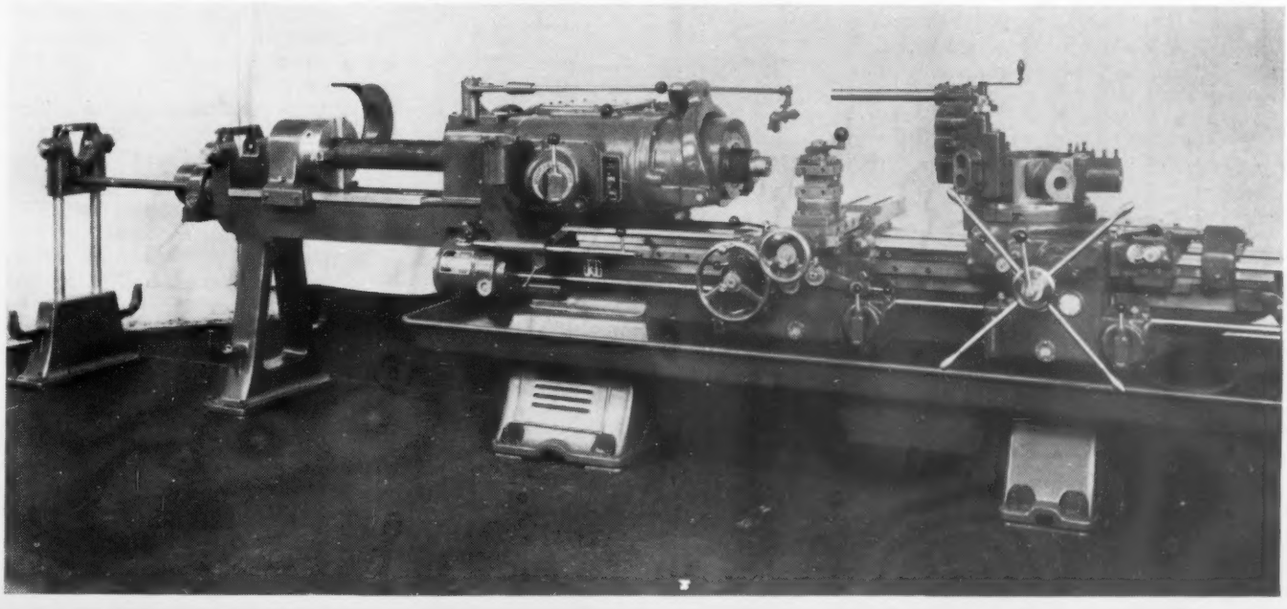
■ Van Norman hand-mill, right, has 6 spindle speeds easily selected. Rack-and-pinion table feed is hand controlled from front or back. Table stops have micrometer adjustments and vertical cutterhead movement has positive control. Equalized belt-tension is maintained on cutter spindle regardless of cutterhead position. Table work surface is 6 x 26 inches. Van Norman Machine Tool Co., Springfield, Mass.



■ Gardner No. 84 30-inch double spindle grinder, left, has 5⅞-inch diameter spindles and can be equipped for high production in grinding parts such as ball bearing races. A special rubber roll feed fixture can be attached which will feed the bearing races between the opposed grinding at 60 to 75 pieces per minute. Races are supported by two hardened steel guide bars extending full length of machine and are discharged by gravity at rear. Work is held to within 0.0003 to 0.0005-inch for parallelism and 0.004-inch for uniformity. Gardner Machine Co., Beloit, Wisc.



■ Jones & Lamson No. 7A-5 saddle type universal turret lathe, below, has a large spindle bore for machining large diameter tubing, etc. Round bar capacity is 5 inches. Swing over way covers is 19 inches, over carriage cross slide 13 inches. Scroll chuck capacity is 12 inches. This turret lathe has a type B1 American standard lathe 11-inch diameter spindle nose. Jones & Lamson Machine Co., Springfield, Vt.



High Speed Fatigue Testing

Since it more nearly approaches service conditions, fatigue testing to determine endurance limits proves a versatile tool in studying service failures. New high-speed machines quickly make complete tests, require only small specimens

By R. R. MOORE
Consultant
Lansdowne, Pa.

■ IN STUDYING factors that influence life of metals in service, research has shown there is a distinct correlation between fatigue tests and such factors. It is for this reason that fatigue testing is being extended rapidly in the study of effects of chemical composition, metallographic structure, heat treatment, mechanical working, corrosion, welding, brazing, soldering, sharp corners, grooves, scratches, inclusions, seams and other factors that may be suspected of being detrimental to the life of a material or a part.

Fatigue failure is really a form of progressive failure. The process of failure starts at the inception of fine, submicroscopic cracks which grow under the action of repeated stress and spread through the metal. Cross section of remaining sound metal thus is reduced to such an extent that the part fails under comparatively low load.

Once a crack is started, its ability to progress and finally to cause a rupture is enormously increased by the highly intensified stresses set up by the sharp edges of the crack which act as stress raisers due to stress concentrations at these points.

Fatigue failures do not give a warning, as ductile materials break suddenly under fatigue.

While it is recognized that materials selected for specific duties must show particular properties such as strength, hardness, toughness, impact resistance, etc., these properties alone do not qualify the material for service. Nature of fatigue failure is quite different from that of failure under these various single-load tests. The factors mentioned above and tests for them are usually of little value in determining cause of failure in service.

Tests to determine the fatigue properties of metals aim primarily at determination of the endurance limit of the metal and the effect of various factors upon this value. The endurance limit is the maximum stress that can be applied repeatedly without causing failure. Thus, fatigue tests are really endurance limit tests, and fatigue testing machines actually show endurance limits.

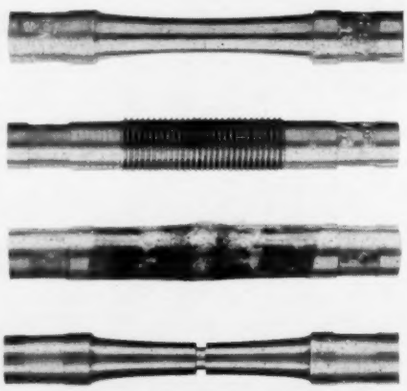


Fig. 1—Top is standard fatigue specimen. Below, in order, are threaded, gas welded and notched specimens

Such machines are of various types and forms, depending upon type of stress which they are called upon to develop. They may produce direct tension-compression, flexure or bending, torsion or combinations of these stresses. Machines that produce repeated bending or flexural stresses are the most common, being employed in more than 90 per cent of all fatigue tests. Popularity of this type is due to its simplicity of operation, the accuracy with which it can be calibrated and the fact that it produces a type of stress commonly met in engineering practice.

For testing cylindrical specimens, a type of machine known as the rotating beam machine is widely employed. In this type of machine, specimen is stressed as a beam supported at the ends and loaded at two points, each about 1/3 of the total span from the end of the beam. Stress distribution in the specimen is similar to that in through section of a beam where maximum fiber stress is at top and bottom, varying to zero at neutral axis. The fibers at top of the specimen beam are in compression and those at the bottom in tension.

As the specimen is rotated 180 degrees under this condition of loading, the fibers that were under tension become stressed under compression and vice versa. Thus with each revolution, the specimen is subjected to a complete cycle of equally reversed stress from tension to compression.

The R. R. Moore high-speed fatigue machine, Fig. 2, includes re-

Abstract from *Baldwin-Southwark*, a publication of Baldwin-Southwark Corp., Paschall P. O., Philadelphia.

cent developments which permit it to operate at the extremely high speed of 10,000 cycles per minute. In addition, it has the advantage of employing a short specimen permitting the sampling of failed parts in which the available material may be limited. Likewise, it is economical of material when extended investigations are being made.

The high speed shortens the elapsed time required for the test and practically eliminates former objections due to the time involved in carrying out fatigue tests.

Detrimental effect of sudden changes in section such as sharp shoulders, grooves, notches, holes, threads, spines,, keyways, etc., upon the service life of machine members is evidenced by the large number of failures occurring at these localities. As is well known, the underlying cause of reduced resistance to repeated stresses at these points is the presence of intensified local stresses brought about by the sudden change in section.

Calculated Values Unreliable

It might be inferred that a determination of the magnitude of these intensified stresses by mathematical analysis, or photoelastic experimental methods, might be possible. However, fatigue tests made on specimens containing such discontinuities show that the endurance limits of the metals are not affected in proportion to the calculated values of the intensified stresses. Also, it has been found that all metals are not affected to the same extent by similar discontinuities. Thus another method is necessary. This accounts in no small measure for the greatly increased popularity of fatigue testing, especially when done with high-speed machines such as illustrated here.

The discrepancy between calculated values and experimental results is due to the fact that metallic alloys are not uniform in structure and do not transmit stresses uniformly in all directions as is assumed when making mathematical and photoelectric analyses of intensified local stresses. Furthermore, all alloys are different in structure and cannot be expected to respond in the same manner. Thus it is necessary to carry out fatigue tests on metal specimens of the alloy under consideration if reliable results are desired.

For most accurate determinations, the tests are performed on specimens similar to the standard but modified to include the discontinuities it is desired to study. Fig. 1 shows typical specimens used to study the effect of a square groove or shoulder, a thread and a gas weld. Similar specimens are employed for other specific tests. For example, tests on a 60-degree V-groove show the endurance limit of SAE 6130 steel is reduced 60 per cent by the groove. Of course, dimensions of groove compared with body of specimen influence the final figure.

Increased use of welding in industry demands an intimate knowledge of properties and characteristics of this method of joining metals. Applied to members of rotating and reciprocating machinery and to structures subjected to vibration, the resistance of weld to repeated stresses becomes an important consideration. Such tests can be carried out readily on a welded specimen similar to that shown. The particular specimen here was made from SAE 4130 steel tube butt-welded at the middle.

Effect of various methods of welding, heat treatment, welding rods, etc., can be determined quickly and reliably by tests on such specimens. In one case it was found that the endurance limit of the welded tube was only 35 per cent of its tensile strength. This would seriously reduce its value if subjected to repeated stress in use.

Materials Tested

As a means of determining reliability of materials, methods of construction and metal treatments, fatigue testing has increased rapidly during the past ten years. No doubt it will continue to increase at a fast pace. This increase is due largely to recognition of the fact that the fatigue tests more nearly represent service conditions than standard routine tests commonly employed in selection of materials. The development of the high-speed testing machine places fatigue tests within reasonable limits of time and economy and forms a notable contribution of the progress of fatigue testing.

Typical of the investigations now under way is one recently completed by United States bureau of standards on causes of failures in railroad rails. Specimens were machined from both the rail head and the web and were taken transversely as well as longitudinally. Fatigue tests were made to determine the effects of methods of manufacture, chemical composition, heat treatment, inclusions, internal stress, shatter cracks, surface flow and hardening of the rail head. Results of these tests have contributed greatly to the improvement in the capacity and reliability of railroad rails and railroad safety.

As an instance of the flexibility of the new type of high-speed testing machines, the bureau of standards has employed it to test extremely long wires to determine the effects of the surface finish of wire. In such tests it is necessary that the wire be tested without removing the surface or reducing the cross section of the specimen to produce fracture outside the grips, as is commonly done on standard fatigue specimens. The machine described here permits tests to be made on full-size wires.

If the wire beam is long enough, the weight of the specimen develops sufficiently increased stresses at midlength to cause failure close to that point. These tests were carried out by removing the housings of the testing machine from their base and supporting them far enough apart to permit testing a 60-inch length of wire. Wires were held in the spindles of the housings by means of small tapered collets. The stresses produced by the holding collet at the gripping point were not sufficient to cause failure at that point in the presence of the increased stresses developed at the midpoint due to weight of the wire.

In these tests it was also possible to study effects of commercial hot-dipped zinc coatings and electroplated zinc coatings on wire selected from production runs.

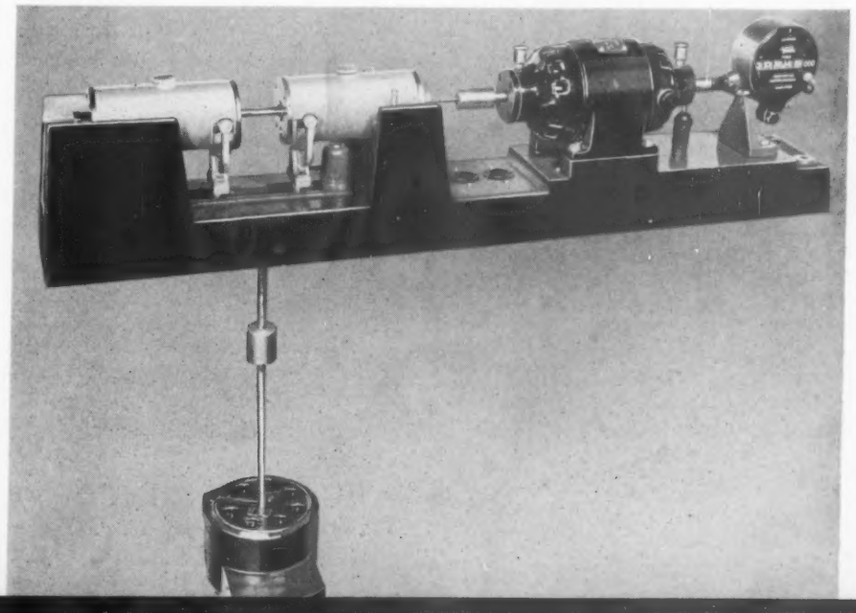
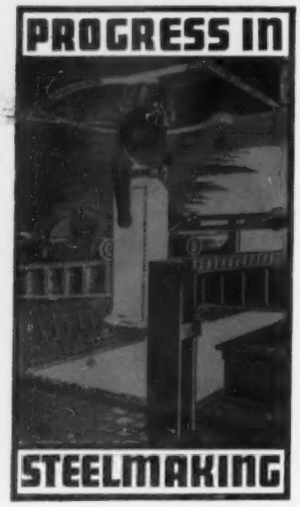


Fig. 2—This late type rotating beam fatigue testing machine developed by R. R. Moore operates at the high speed of 10,000 revolutions per minute. Only a short specimen is needed



"Dry" Furnace Practice

Outside air conditions and availability of low-temperature of water greatly affect operation of dry-blast air-conditioning plants. Basic data reduced here to easily understandable curves for cost study of three most practical systems

■ FROM an air-conditioning point of view, there is nothing new in the basic problems of calculating the load and selecting suitable equipment for dry-blast furnace operation. In the design of such plans, however, there are certain conditions not encountered in general air conditioning practice which require special consideration. Of these the most important are:

Capacity in cubic feet per minute. While volume of wind may be calculated, it primarily is a matter of furnace design and experience. Thus, this figure should be set by the blast furnace people.

In checking or fanning, blast pressure is reduced as much as 90 per cent at predetermined intervals, thereby reducing velocities through equipment to a fraction of normal. So provision must be made for elimination of entrained liquids through an abnormal range of velocities.

Outside air conditions. Often furnace location has much influence on the air-conditioning equipment. For instance, in using water from rivers, the water temperature in the river may rise to 115 degrees Fahr., due to repeated usage, resulting in considerable vapor arising from the surface and often being wafted toward intake of the blowing engines.

Likewise, where cooling towers are used, winds of unfavorable direction can sweep vapor from them across the air-conditioning intakes and so cause slugs or sudden shots of moisture to be introduced.

Sensible heat liberated by furnace and mill operation often may raise dry bulb temperatures as much as 2 degrees Fahr. and wet bulb as much as 5 degrees Fahr. above those indicated by weather bureau records. Thus due caution to check this factor is essential.

Usual air-conditioning practice is to design a plant for the average of the maximum sustained for a duration of at least three hours during ten different days of an average summer. While entirely satisfactory in 99 per cent or more of all comfort and industrial air-conditioning installations, it is different with blast plants for all outside air must be taken at whatever conditions exist. In case of 3-grain cooling by condensation before compression the 4-degrees difference in wet bulb temperatures between maximum and average which may easily exist calls for 17 per cent more refrigeration. In a plant designed for 3-grain dew point at the average maximum wet bulb, these 4 degrees will result in a rise to 4 grains, an increase of 33 per cent.

Whether usual air-conditioning practice should or should not be followed in dry-blast operation seems to require more data on the value of regularity than now available.

This study is based on maximums of 80 degrees wet bulb for cooling-before compression plants, 10 grains per cubic foot for dehydration plants and 10 grains per cubic foot for after-compression plants.

Strength to withstand pulsation. Where a centrifugal blower is used, this is no problem. With reciprocating blowing engines, however, this requires careful consideration as cylinders range from 7 to 9 feet in diameter with strokes from 5 to 7 feet. With two cylinders to an engine and at least two engines to a furnace, the variations in amount of wind produced by varying speed of one of the two engines produces a beat which cycles according to the relative speeds.

Resulting pulsations are of considerable magnitude and vary in direct relationship to the resistance to air flow, and on the suction side indirectly to the distance to the air cylinders. In addition, while the movement of the air column through equipment and connections is unidirectional, it contains a velocity wave which also depends upon relative speeds and positions of the pistons of blowing engine.

Pulsations in Air

At a point near the cylinders of the Woodward blowing engines, a pulsation having a total span of 12 inches water gage, 61 pounds per square foot, was observed. Although average pressure at point of observation was considerably below atmosphere, flow of air through the opening cycled first inward and outward under combined influence of suction and momenum of the air column. In the dew point chamber, maximum observed was a total pressure range of 3 inches. Waves were felt throughout the entire system and required addition of strong channel-iron bracing to the outside air intake in Fig. 3.

While magnitude of pressure and velocity waves as such is not great,

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Part I of this article, STEEL, Nov. 20, p. 54, gave much design information on dry-blast plants. Part II here details special considerations entering into dry-blast work and discusses basic economics of the three most practical systems . . . all abstracted from a paper presented by L. Logan Lewis, vice president, Carrier Corp., Syracuse, N. Y., at Eastern Air-Conditioning conference sponsored by American Society of Refrigerating Engineers at Lehigh university, Bethlehem, Pa., and used here through courtesy of "Refrigerating Engineering," 37 West Thirty-ninth street, New York. Already the first modern installation of dry-blast equipment, described in Part I, has proved so satisfactory that Woodward Iron Works, Woodward, Ala., is installing a second

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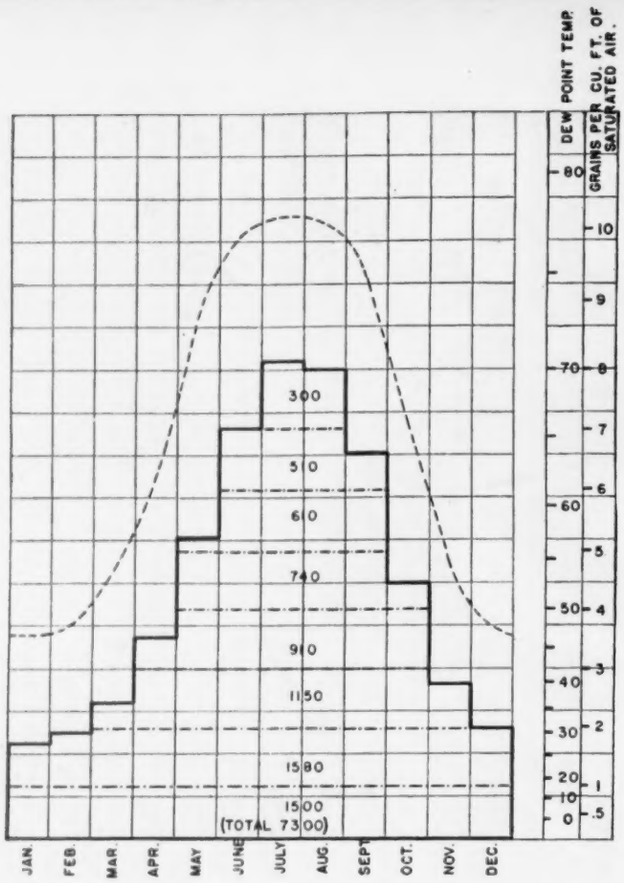

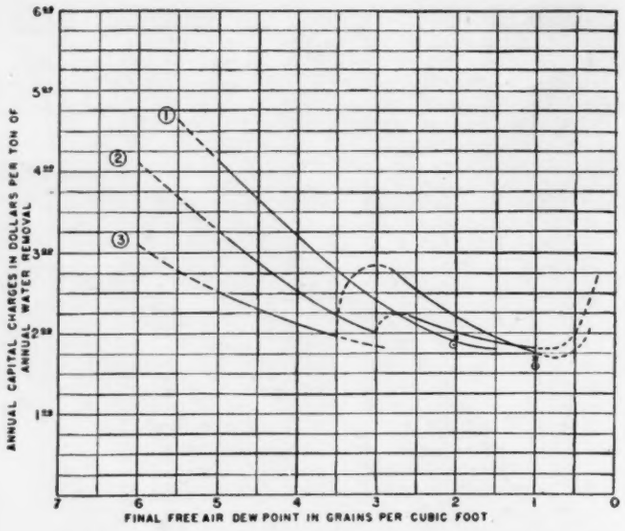

Fig. 5—Left, tons of water removed from 50,000 cubic feet of air per minute over a year's period under conditions stated

Fig. 6—Above, annual capital charges for 50,000-cubic feet-of-air-per-minute plants based on 85-degree cooling water and 15-pound blast pressure

the impact in this instance was about 30 pounds per square foot near the air cylinders and about 7.5 pounds per square foot at the air-conditioner. Frequency of the beat varies widely, and undoubtedly will at times coincide with natural vibration frequency of flat panels, eliminators, air cooling coils, dehydrant beds, etc.

Final dew-point temperatures. Selection of final dew point at which moisture is to be removed is the essence of the economic and design problem. Initial conditions are fixed by weather and plant environment. First cost of the plant is determined by its instantaneous capacity to lower moisture content.

Of equal importance is the usage factor, which includes the number of months of the year during which the plant can be used for obtaining regularity and the tons of moisture which can be removed from the wind during a year's operation. Both items are vital.

Basic Data for Cost Study

Primary effects of dry blast are: More iron is produced with less coke per ton because water vapor is kept out of the furnace. Regularity is enjoyed because moisture content is controlled. Primary economic factors are therefore: What dew point should be selected, how much water will be removed and what will be the cost.

In normal air-conditioning, such problems are relatively simple. In dry blast, however, there are a tremendous number of interlocking factors. To reveal these, some unit of performance must be used to include the factors of time and capacity. *A yardstick of one ton of water removed from the blast during one season of one year's operation is best suited for this requirement.*

To establish bases from which moisture removing performance may be determined, Pittsburgh was selected as a typical location since weather-bureau records cover a long period of time here. As no records available include all needed data, it was decided to use values of dry bulb and relative humidity as representative of total moisture content and total heat content. While this involves a small error, it is on the conservative side.

Each month of the year was considered separately. From the all-time mean dry bulb and mean relative humidity, the average dew point was determined. This set the total number of tons of water vapor to be removed to bring the air to absolute dryness. Assuming each month as 1/12 of 365 days, total moisture content was converted into area and plotted in Fig. 5.

Enclosed area represents total tons of water vapor removed from 50,000 cubic feet per minute of wind during a year's continuous operation, provided all traces of moisture could be removed. This totals 7300 tons of 2000 pounds each.

Horizontal bands formed by the dot-and-dash lines include areas which represent the tons of water removed within each particular band. For instance, a plant operating at a 7-grain dew point would remove during a season's operation 300 tons of water vapor. At a 6-grain dew point, 300 tons in the 7 to 8 degree band would be removed plus 510 tons in the 6 to 7 degree band, a total of 810 tons. Cooling to a 3-grain dew point would remove 3070 tons; to a 1-grain dew point, 6800 tons.

First costs cannot be used either as contractual prices or as budget prices because experience has proved that local conditions have a material influence upon the cost of plants of the same type and capacity. Unfavorable conditions may increase costs 15 to 20 per cent. Extremely favorable conditions may cut them 10 to 15 per cent. Primary purpose of this study is to reveal partly concealed and shifting relationships between several types of plants.

All first costs are based upon water at a temperature of 85 degrees Fahr. Availability of cooler water will reduce the cost. Operating costs are based upon steam at 15 cents per thousand pounds, electric current at 5 mills per kilowatt hour and water at 4 mills per thousand gallons.

Since type of plant and dew point selected materially influence power required for blowing, additions to or subtractions from blowing engine power must be included in operating cost.

As dry blast affects furnace gas balance, each type of installation increases to some degree the amount required by the stoves.

In setting up capital charges, the

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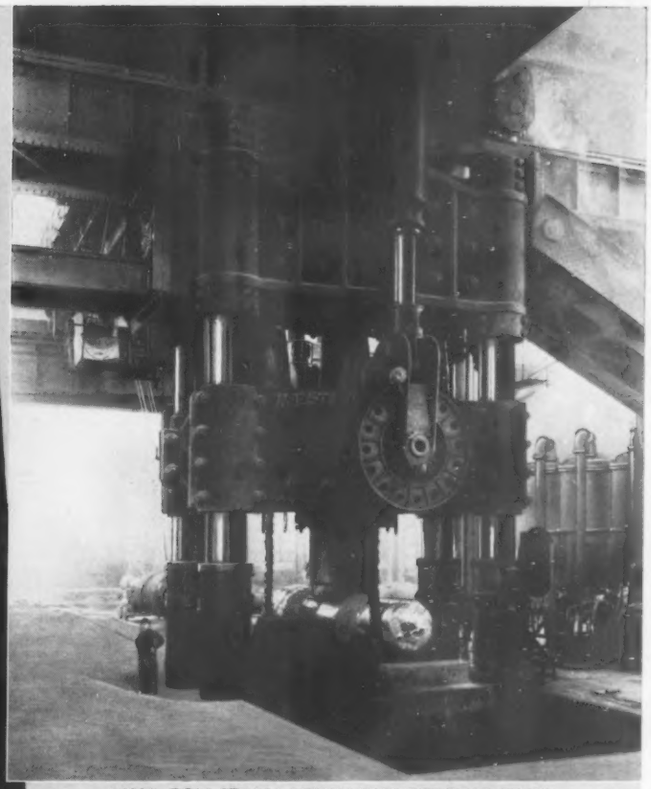

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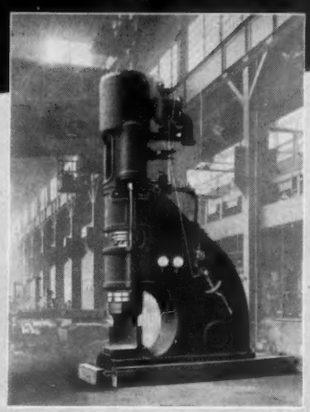

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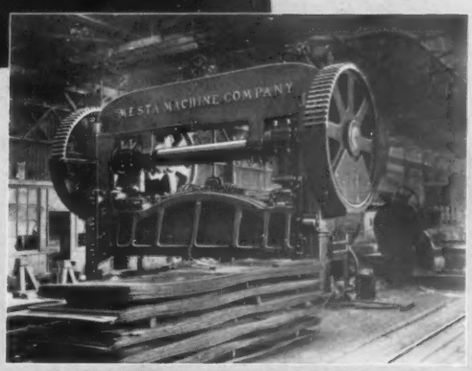

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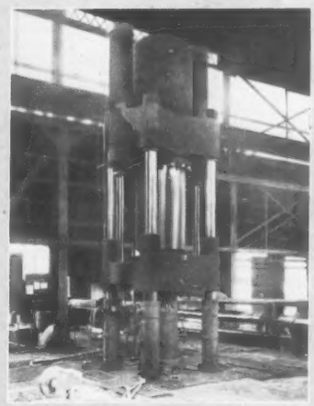
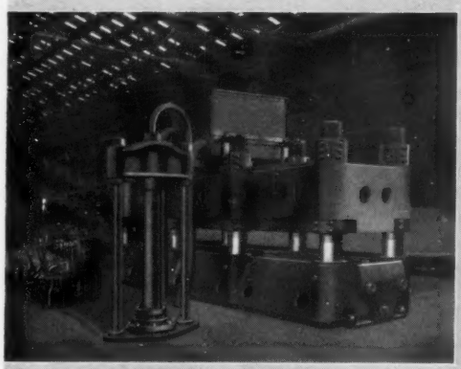
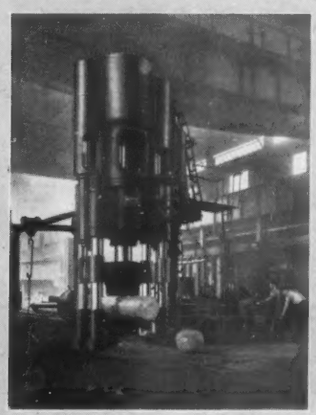


700 TON HYDRAULIC PIERCING PRESS



4000 TON HYDRAULIC AUTOMOBILE FRAME PRESS



800 TON STEAM HYDRAULIC FORGING PRESS

2000 TON STEAM HYDRAULIC FORGING PRESS—FORGING 58" INGOT

MESTA MACHINE COMPANY
PITTSBURGH, PA.

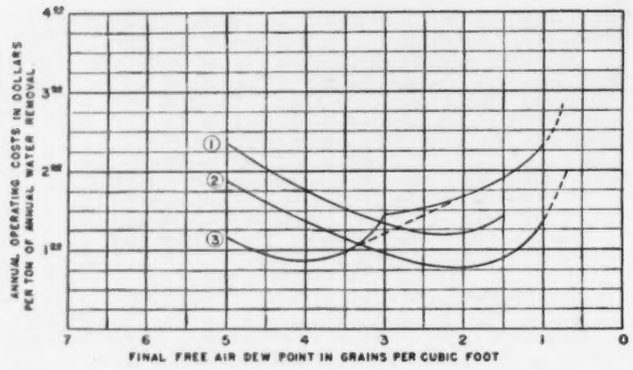


Fig. 7—Annual operating costs for 50,000-cubic-feet--of-air-per-minute plants with water at 85 degrees; blast pressure, 15 pounds

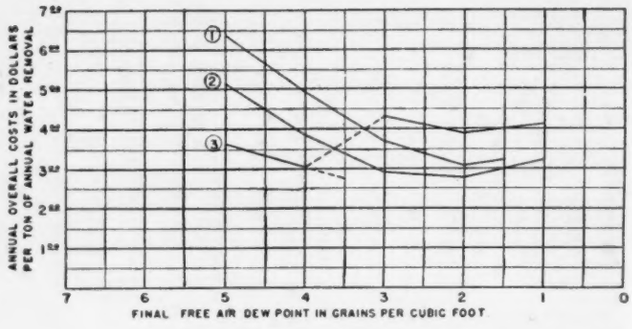


Fig. 8—Annual overall costs for 50,000-cubic-feet-of-air-per-minute plants, a composite of Figs. 6 and 7

plant is charged off in 15 years. Annual capital charges are set up as 10 per cent of overall first cost.

Other conditions include capacity of 50,000 cubic feet per minute of wind suction side of plant to operate at 29.19 inches barometer and compression side of plant at 15 pounds gage pressure.

Relations Between Performance and Capital Charges

Fig. 6 shows ratio of capital charges to total tons of water removed. The dotted lines represent curve extensions unsupported by detailed cost study.

Three types of plants are studied. "Steps" operation is considered to hold capital charges down by designing the plant and size of equipment for a high dew point but to operate it by stepping down to low dew points as winter approaches. Dew point is again stepped up in the spring. Dew point at each step is held constant. Furnace burden would, of course, be readjusted at each step as weather permitted.

As expected, these curves show capital charges per ton of water removed become smaller as the capacity to remove water is increased. While more dollars must be invested for low-dew-point plants, the optimum results per dollar invested are to be had with those plants.

After-compression plants employ-ploying condensation are shown by Curve 1, Fig. 6. This is not extended past 1½-grain dew point because at 15 pounds blast pressure it is close to the frosting point where brine must be substituted for water. With increased blast pressures, lower dew points may be had without frosting.

The relatively high capital charges at high dew points are due to equipment for recovering heat of compression; this item is less significant at low dew points. Capital charges for this type of plant are sensitive to cooling water temperature. Costs will be lowered if water is available below 85 degrees Fahr., but will rise with increased temperatures.

In considering this type of plant, it must be remembered that heat of compression almost doubles the work to be done on a free-air basis. Also it is least adaptable to "step" operation because the refrigeration is a relatively small part of its first cost.

Before-compression plants employing condensation are shown in Curve 2, Fig. 6. Outstanding advantages of this system are that the curve trends downward until the freezing point of water is reached, where it takes a sudden rise due to requiring an extra brine stage, after which it again follows the basic downward trend.

This is simplest and most rugged equipment at a 3-grain dew point. Equipment for going below 3 grains can be added with a minimum disturbance. Such plants are well adapted to step operation.

Before-compression plants employing dehydration are shown in Curve 3, Fig. 6. This system quite obviously is lowest in cost for high dew points, reaching a minimum between 4 and 3 grains and again at a point slightly below 1 grain. The dotted extension of the heel shows what could be done with colder water, this system being quite sensitive to cooling-water temperature. Where the hop begins, something over 400 tons of refrigeration is being accomplished with 85-degree water, following it some 400 tons of mechanical refrigeration must be added. It seems obvious that if mechanical refrigeration be employed to do part of the work at a somewhat higher dew point, a lower cost could be had.

The dehydration plant is well adapted to "step" operation.

Operating Costs

Fig. 7 shows ratio of annual operating cost to total tons of water removed. In each case, the operation of the dry-blast plant is charged with the extra blowing-engine horsepower required to compensate for extra resistance to air flow. Likewise, credit is given for reduction due to precooling of the air before it enters the engine. To eliminate controversial items, same allowance for supplies and maintenance is included for each type of plant. While some plants will require more attention that other, the difference is not significant.

After-compression plants employing condensation have refrigeration costs much lower than before-compression condensation plants, due to high-temperature planes in which the work is done. See Curve 1, Fig. 7.

This low cost, however, is offset by extra work which must be done due to heat of compression, extra blowing-engine horsepower due to high resistance to air flow, and failure of this system to save blowing-engine horsepower by precooling the wind.

The plant considered recovers 42 per cent of heat of compression under maximum outside conditions. If furnace requires blast at 1300 degrees Fahr., this 58 per cent loss of heat of compression will impose an extra heating load of approximately 6½ per cent upon the stoves.

Before-compression plants employing condensation give Curve 2, Fig. 7, which is contrary to usual power performance characteristics of refrigeration. The downward trend is due entirely to significant saving in blowing-engine horsepower. Power required to overcome airflow resistance is low.

Savings in blowing-engine horsepower pull the curve downward until the dew point reaches 2 grains, where it becomes insufficient to overcome the rising power per unit of refrigeration.

The heat of compression covered with this type of plant is nil. On basis of 1300 degrees hot blast, the plant operated at 4 grains imposes a 5 per cent extra heat load upon the stoves; at 1 grain, approximately 7½ per cent.

Before-compression plants employing dehydration as shown in

(*Please turn to Page* 78)

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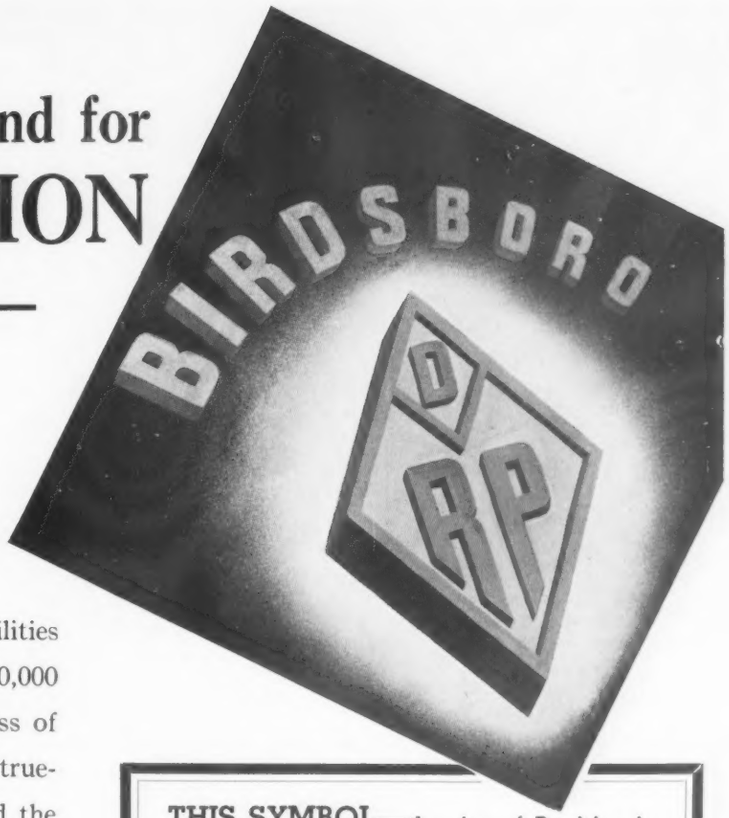

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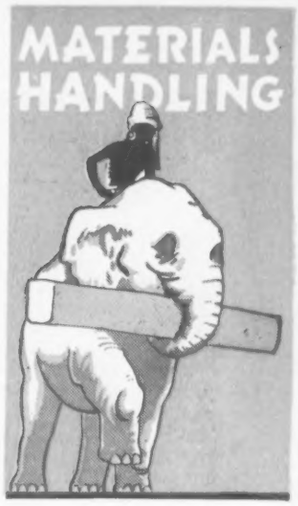


New Parts Plant

. . . features efficient layout for handling large number of small units through widely varying sequence of operations. Skid and tote boxes are standardized to give maximum flexibility

■ RECENT formal opening of the Cheektowaga plant of Spencer Lens Co., just outside Buffalo, marks completion of first step in a comprehensive expansion program. Built by Gillmore-Carmichael-Olson Co., Cleveland, the new plant covers an area 210 feet wide and 410 feet deep on a 25-acre tract of land. An automatic power plant, detailed later, adjoins the main building. While nothing but mechanical parts for microscopes and other scientific optical instruments are manufactured at the new plant. It was located with full consideration of additional production units being added as required.

Efficient layout for handling of material is an outstanding feature of the new plant. The tool crib is placed along the north wall so as to be out of the main workroom area and yet readily accessible. Above the tool crib, on the second floor, is the cafeteria and locker room.

Main Plant in Large Room

The main plant extends in one unbroken room, 120 feet wide and 380 feet long. A view in this room is shown in Fig. 1. Sawtooth roof bays are 30 feet wide, there being six of them in the 180-foot width of the building, four in main room, one north for tool crib and one at south for finishing and heat-treating departments. Corrugated glass skylights extend along entire north wall of each roof bay in main room providing ample daylight illumination. This is supplemented by combination mercury-and-Mazda lighting fixtures mounted on 20-foot centers throughout the entire area. Each lighting fixture contains a 400-watt mercury-vapor lamp and 450 watts of Mazda lamps giving an intensity of from 45 to 48 foot-candles on the working area throughout the plant. In addition, localized lighting is used on machine tools and at other points where operations are extremely critical.

Layout of this main workroom was made with due consideration to handling of material throughout the various operations. About 75 per cent of the parts made here are of brass. Others are of aluminum and various grades of steel. In addition, many sheet steel parts are employed in manufacture of cases for such units as film projectors.

Present machinery in departments is arranged with enough floorspace remaining to permit doubling the present capacity of the plant if this becomes necessary. In all cases, wide aisleways are reserved around production units for maximum accessibility.

Handling equipment has been carefully standardized to meet manufacturing requirements in this plant. The main unit employed in handling work is a skid having two wheels at one end and two legs at the other. The end supported by legs is raised by means of a special dolly whenever the skid is to be moved. This dolly has wheels facilitating movement of the skid. See Fig. 3.

Skids have a floor area of 36 x 28 inches. Removable sides are

Fig. 1. (Upper)—View in main room of new parts plant. Fig. 2. (Lower)—Here are a few of the units in the heat-treating department which adjoins the room above

For continuation of the foregoing article entitled "New Parts Plant" please turn to Page 52

A.F.A. Publishes Code on Metal Cleaning Sanitation

■ *Recommended Good Practice Code for Metal Cleaning Sanitation;* paper, 42 pages, 8½ x 11 inches; published by American Foundrymen's association, Chicago; supplied by STEEL, Cleveland, for $2.50.

This is the fourth in a series of recommended good practices developed by the association's committee on industrial hygiene. Subject matter covers recommended practices and installation for alkaline, solvent, solvent degreasing, metal pickling, tumbling mill and abrasive blasting cleaning processes, as well as pertinent information on metal cleaning generally, for prevention of accidents and minimizing exposure to occupational disease. Published in planograph form, the book is illustrated with diagrams. As far as the committee has been able to determine, this is the first time that definite engineering recommendations dealing directly with the hazards involved have been published.

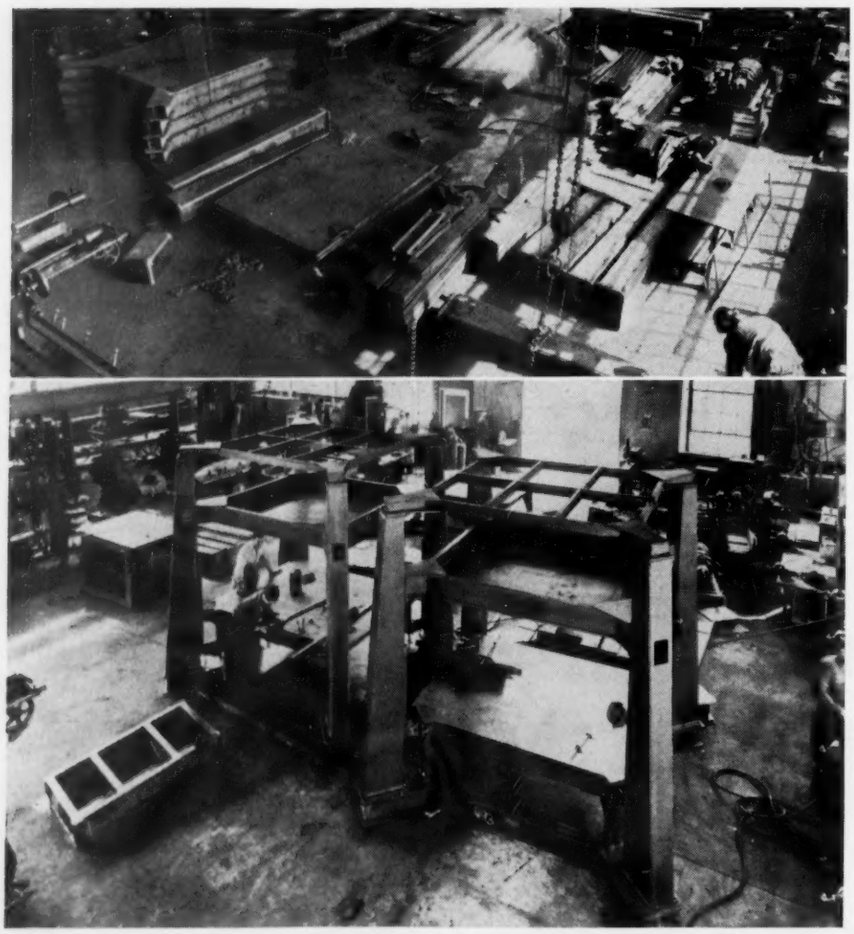
The section on solvent degreasing processes should be helpful to those considering the newer methods of cleaning by chlorinated hydrocarbons. The abrasive blasting cleaning processes section is timely because it is applicable to old as well as new installations for exhaust and accident prevention requirements.

While use of tumbling mills is old, all types of mills are covered, including continuous mills as well as stave, internally and externally ventilated types of batch loaded mills. An effort has been made to provide more adequate exhaust system requirements to carry the dust and dirt to the dust collection system equipment and prevent its dropping to the mill floor where further dust hazards are introduced in its disposal.

The code material can be used to advantage by those purchasing and installing new equipment or renovating old equipment and it should afford the essential information that might be included in industrial codes of regulatory bodies. The material has been some two years in preparation by the committe and numerous conferees having special knowledge on the matter.

First three codes developed by the committee have been well received in the foundry and allied industries. The first two now are in second edition.

Fabrication And Erection Speeded By Welding



■ **These frames for the large hydromatic welders manufactured by Multi-Hydromatic Welding & Mfg. Co., 9640 Grinell, Detroit, were fabricated entirely by welding with the aid of two arc welders. Only seven days were required to advance work from stage shown in upper illustration to that in lower. Photos courtesy Lincoln Electric Co., 12818 Coit road, Cleveland**

Meters Restyled

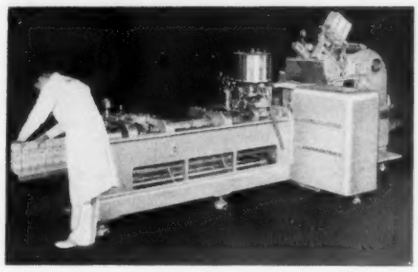
■ Restyling of its line of meters for power plants and industrial processes is announced by Bailey Meter Co., 1050 Ivanhoe road, Cleveland. Among improvements made is a piano-type hinged door which closes upon a synthetic-sponge gasket to seal the sensitive meter parts from moisture and dust. A narrow tray at top of meter casing prevents dust from falling into meter when door is opened. Durability and rigidity have been increased by a steel ring welded to the meter casing.

Only the information necessary for reading of the chart record now is seen through glass window of the meter. On boiler meter shown here, information is given on a plastic molded scale which indicates the rate of steam flow from the boiler and reminds operators how to secure maximum economy by use of the meter.

Following the trend to improved appearance, this recorder has been restyled to simple flowing lines and utilizes distinctive coloring on its instruction charts

NEW METAL PRODUCTS

■ A milk-packaging machine known as "junior" designed especially for small to average-size dairies is announced by Pure-Pak division, Ex-Cell-O Corp., 1200 Oakman boulevard, Detroit. This new machine does a complete packaging job in one continuous automatic operation. The flat container blanks enter the



Junior forming unit at the front end and emerge—one every 3 seconds—from the other end filled. Container blanks are automatically picked up by vacuum cups and fed into the forming unit where the containers are shaped and bottoms glued. Pure-Pak Junior occupies 50 square feet of floor space and is 17 feet 4 inches long overall.

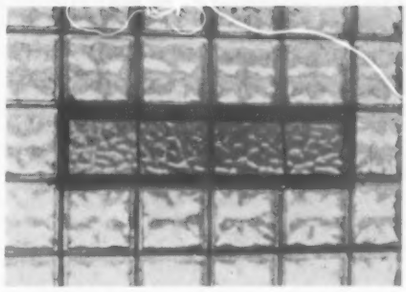
■ Gar Wood Industries, Inc., Hoist & Body division, 7924 Riopelle, Detroit, announces a new load-packer truck for compressing all types of garbage into a compact full-capacity load that is many times greater by weight than the usual loose load. For loading, a door in tailgate ram is swung up for filling of the hopper. After hopper has been filled, the loading door is closed and becomes part of the tailgate ram. The valve operating lever at rear of body then is moved and the two hydraulic cylinders thrust the tailgate ram against garbage in hopper, ramming it from the hopper and packing it into the body.

With one movement of the tailgate ram lever taking 10 or 15 seconds, loading is accomplished. The hopper being all enclosed, doors are confined and papers cannot blow away. There is no unsanitary trough or bucket on the outside to permit spillage. Load is dumped in conventional manner.

■ An adapter for mounting Standlite lighting fixtures on globe-fitted gasoline pumps has been developed by Goodrich Electric Co., 2900 North Oakley avenue, Chicago, for use where pump islands are cramped for space or for stations located off the main highways where traffic is not sufficiently heavy to warrant the expense of installing and wiring pole-mounted Standlites. The tubular mounting bracket with concealed wiring attaches to the collar of the pump and provides a new

standard 6-inch fitter for the globe. The adapter may also be supplied with switch so that either the globe, the Standlite, or both, may be burned at the same time. Standlite may be mounted with edge of reflector 46 inches above the top of the pump, and thus provides ample illumination for the area around pump. The complete assembly which includes porcelain-enameled Standlite is for concealed wiring and is weatherproof.

■ Adequate ventilation for homes and offices where glass block is a part of the wall structure is provided by the Winco air vent made by Winco Ventilator Co., St. Louis. Ventilators have a rust-proof and insect-proof screen and are made of bright stainless steel supplied by American Rolling Mill Co., Middletown, O. They are burglar proof, give ventilation without draughts, can be easily adjusted to any position and can be opened during heavy



rains. The Winco is available in five different shapes and can be installed in any standard size glass blocks.

■ A completely automatic molding machine for thermosetting plastics is announced by F. J. Stokes Machine Co., Olney P. O., Philadelphia. Rated at 15 tons and having a 10-inch stroke, it will produce moldings requiring up to 18 tons pressure and mold parts up to 4-inch height, 6-inch length and 19-square-inch projected area.

Machine features an adjustable bolster to reduce the length of ram travel and thus increase production rates on shallow work. Single-cavity molds are used and the machine, operating continuously, equals production rates of the large multi-cavity molds used in conventional molding methods.

One mold produces up to 10,000 or more pieces per week and proportionately greater when two or more molds are used in the same machine. This machine is fully automatic, self-contained, electrically heated and powered. It stops automatically and sounds a warning signal if a molding fails to eject or the material hopper is empty.

■ A head dress of stainless steel for kitchen ranges is made by Eagle Foundry Co., Belleville, Ill., using Armco 18-8 stainless for top and back guard. Acids will not cause metal to tarnish or grow dull. Grease and effects of "boil-overs" can easily be removed by soap and water.

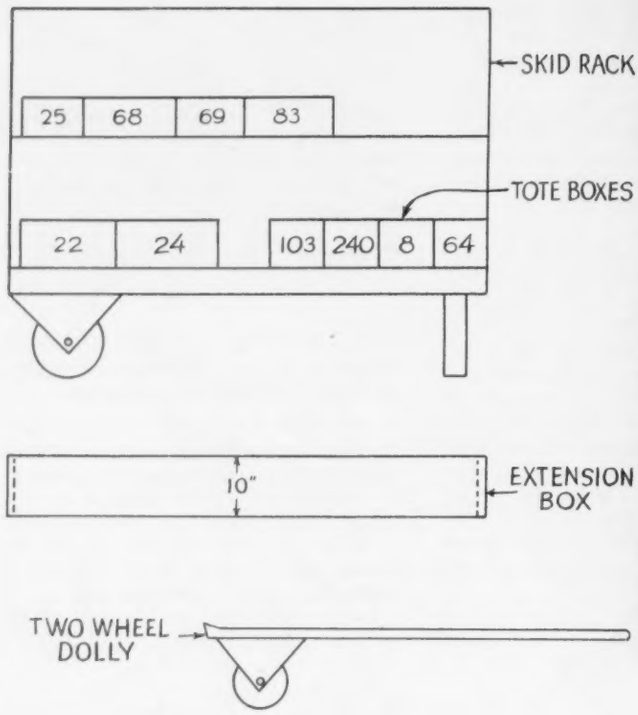


Fig. 3—Top, skid with rack for holding metal tote boxes. Extension sides make skid box of any depth desired. Two-wheel dolly lifts legs of skid off floor when it is to be moved

made up in units each 10 inches high with reinforced corners. These extension box sides can be nested on top of each other to form a box as deep as may be desired in handling large bulky parts such as sheet metal stampings.

For small objects, no sides are placed on the flat skid but a rack is set on it. This rack has provision for carrying two layers of sheet steel tote boxes as shown on accompanying sketch, Fig. 3. Tote boxes are in three standard sizes, of such dimensions that each smaller size will fit crosswise in formed lip of the next larger. This lip also permits boxes of same size to be nested on top of each other.

Each tote box carries its own serial number so when a job starts through the factory to go to the different departments for the various operations, it is traced easily since the number of the tote box appears on the order.

Treated Wood Blocks on Floor

Plant floors consist of treated wood blocks which permit trucks to be moved about smoothly and with little noise.

Flow of material through the plant roughly follows a U-path. At east end of plant may be seen the raw material storage where incoming stock is handled. From here the material passes to the particular department in which it is to be fabricated, sheet steel going to the sheet metal department, castings going to the milling and grinding departments and screw stock going to the screw machine department.

Fig. 4—Typical of the many special and exceedingly accurate machine tools in this plant is the jigboring machine shown here. It is used in the tool department

Also along the east wall is a series of scrap bins into which all waste material produced during operations is sorted.

At the southwest corner of the main room is a bakelite department where molding machines and cooling presses are employed using an hydraulic accumulator as a common pressure supply. In this department is made a large variety of plastic mountings, cases and similar items.

Immediately adjoining the main plant area at the south are four rooms housing the heat-treating, enameling, plating and polishing departments respectively. Details of finishing practice in the polishing, plating and enameling departments will be covered in a second article.

Fig. 2 shows some of the equipment in the heat-treating department. Most of the work handled here consists of tools and dies for

(*Please turn to Page* 77)

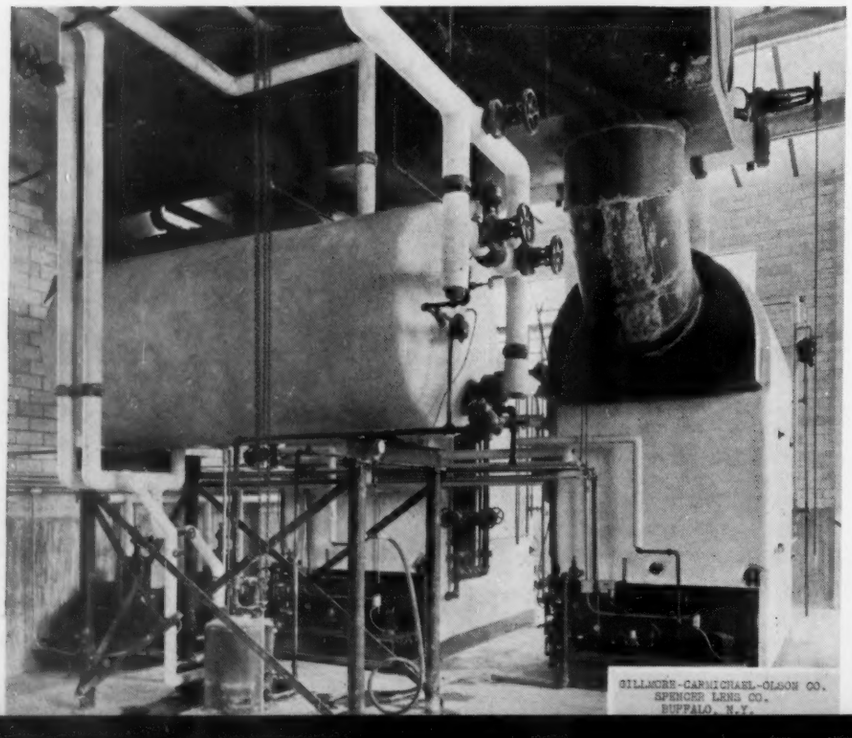


Fig. 5—Two 176-horsepower boilers operate automatically, one of the few such installations in existence

Destined to Blanket

. . . BUT NOT DRIFT

STEEL's 1940 Yearbook issue, dated January 1, is destined to *blanket* the metalworking industry . . . Its coverage shall be thorough with no ground left uncovered—and the "fall" will be geographically distributed with no deep drifts or barren spots to unbalance the efforts of the advertising pages therein.

Any worthwhile advertising message in this issue is bound to have a receptive audience.

STEEL's

1940 Yearbook Issue

Induction Heating

. . . of inside surfaces followed immediately by a water-spray quench is newly developed method for hardening inside wearing surfaces on many articles such as cylinders, sleeves, bearings, oil-well casings, hubs and others

■ A NEW method of heat treating metals by electrical induction, which makes possible the hardening of inside diameters of cylinders and other bores, has been developed by Budd Induction Heating Inc., a new subsidiary of Budd Wheel Co., Twenty-fifth street and Hunting Park avenue, Philadelphia.

The process, which already is being utilized in production work at the Budd Detroit plant, makes possible the heat treatment of inside diameters of metal cylinders from 2 inches in diameter and larger, and in lengths up to 50 feet. The area treated, depth of treatment and degree of hardness developed are controlled within exceedingly close limits, while timing of the operation is a matter of seconds.

In hardening inside diameters in which the treated area is of considerable length, such as engine cylinders, a retracting type head heats the material evenly by electrical induction as it is drawn at a uniform rate through the cylinder. Heating is followed by a water quench.

On one of the machines now in regular operation, a "one-shot" type of head is used to harden the bore of automobile hub forgings, thus making the roller-bearing race an integral part of the hub. In this application, the treated area is brought to a hardness of 58 to 64 Rockwell C. Nearly two million pieces have been turned out on these machines during the past three years without a failure being reported, it is said.

Success of such an operation, requiring exceedingly accurate control of area, depth and hardness in the treated area, has led to the further development of the process for inside diameters of widely varying lengths and sizes of bores. Thus the new treatment may be applied to a wide range of sizes of interior diameters of cylinders and bores of various types.

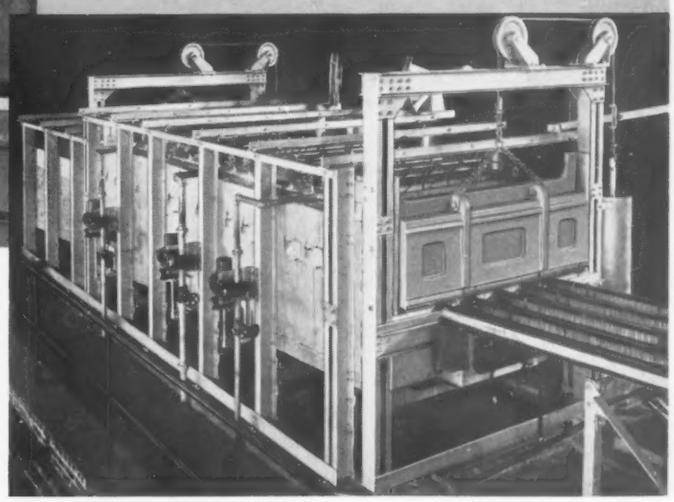
It is anticipated that the process will find wide use. Other practical applications include cylinder bores of diesel, gasoline and steam engines; oil-well casings; and inside diameters of sleeves used in sleeve-valve internal-combustion engines. Many other applications are under consideration.

While present equipment is applicable to diameters of from 2 to 7½ inches, and lengths up to 30 inches, treatment of an even wider range

An automobile hub in place in the induction heat-treating machine just after the hardening operation has been completed. Machine head has been lowered into barrel of hub, which is heated by electrical induction. As head is withdrawn, water at high pressure is forced out through a quenching fixture to complete the hardening operation—all in a few seconds

Heating Problems SOLVED

with the Aid of B&W INSULATING FIREBRICK



Designed and complete roof built by The Selas Company of Philadelphia.

Chamber—16 ft. long by 6½ ft. wide by 18 in. at charging end and 24 in. at discharging end above rails.

Side walls, doors and floor lined with B&W K-20 Insulating Firebrick.

Work—Tubular steel sections 9 in. diameter by max. of 5 ft. long.

To meet exacting metallurgical specifications, the design of this stress-relieving furnace for formed tubular steel sections involved the use of a particularly small combustion chamber, with burners distributed over the entire charge and located in a flat roof only 9 inches above the charge.

Requirements which were met with the aid of B&W Insulating Firebrick include:

Uniform heating
Close temperature control
Low fuel consumption
Economical construction

THE BABCOCK & WILCOX COMPANY
REFRACTORIES DIVISION: 19 RECTOR STREET, NEW YORK, N. Y.

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BABCOCK & WILCOX

THE BABCOCK & WILCOX COMPANY 80 REFRACTORY BRICKS and MORTARS

of sizes will be possible when this is required, company officials state. Development work has been completed and the process tested and proven in production; application to sizes other than those handled by equipment already installed will require only the adoption of known engineering principles in the design of equipment to handle other sizes.

Induction heat treatment is applicable to all ferrous materials of suitable analysis. This includes any material which may be hardened, drawn, tempered, annealed or normalized by generally used methods. Gray iron, such as used in many engine cylinder blocks; cast steel pipe; cast iron and other materials also are subject to the process.

In materials containing "free" or uncombined carbon, recombinations of this carbon at a greatly accelerated rate can be accomplished through this method of induction heat treatment, thus markedly increasing the "hardenability" and strength of the area treated. The grain size of the treated material may be made consistently smaller, which is considered an advantage in most applications as improved physical properties can be developed in this manner.

The process permits redesign of parts with lowered weights and costs in cases where integral localized heat treatment may favorably alter the metallurgy of the casting or forging to the point where a predetermined area on an inside diameter of the original casting or forging becomes a hardened wear-resisting surface. Such redesign is possible, for example, in the development of an integral internal roller-bearing race within a wheel, or in the hardened and honed internal diameter of a cylinder sleeve.

Unhardened Areas Machined

An important feature of the process is that the outside diameter and all other unhardened areas can be machined after heat treatment of the inside diameter or bore. As the depth of the hardened area is accurately controlled, the area which can be machined after the bore has been hardened can be determined precisely. Sections of the bores which need hardness can be treated accurately to produce this quality, leaving tough machinable metal in all other parts of the hub, cylinder, sleeve or other part under treatment. Further local heat treatment also is possible after machining.

Because of the short heat cycle employed, the whole hardening operation is performed in one to three seconds and decarbonization is no longer a heat-treatment problem. It does not occur.

The short cycle, in combination with an almost instantaneous quench which follows, reduces oxidation to a minimum. Oxidation can be eliminated entirely when special provision is made to prevent it, according to reports.

Control of area, depth and degree of hardness obtained is extremely accurate. The control system operates automatically to insure uniformity of hardness throughout the treated area, uniformity of area treated and uniform depth of areas hardened. Steady production of units of controlled metallurgical properties thus is assured. Depth of the area hardened can be varied from 0.03 to 0.125 inch or more as required.

Because of the high speed of heating, and the fact that only the area and depth to be hardened are subjected to heat treatment, distortion is held to a minimum. Annealing or normalizing treatments are required less frequently for units hardened by the new process.

Machines for doing this heat-treating work are designed for rapid changeover from one size of bore operation to another. Flexibility as well as accuracy of control has been built into the equipment thus making possible efficient production of different size units without time-consuming changeovers and with operation of minimum number of production lines. No trucking or handling of parts between departments is necessary between process operations.

Age Hardening Symposium Takes an Inventory of Factual Information

■ SCME 30 years ago in a German research laboratory, Dr. Alfred Wilm was baffled by inconsistencies in test results from heat treating certain aluminum alloys. He observed that pieces tested soon after heat treatment showed low strength and hardness, while those tested after several days were much stronger and harder. He pursued investigation of the phenomena, correlated alloy compositions with heat treatments and eventually perfected what is still one of the most popular strong aluminum-base wrought alloys—duralumin.

Wilm's work is believed to mark the beginning of metallurgical research into age hardening or "precipitation" hardening as it has come to be known. So important has the subject become, especially in view of the intense activity in aircraft manufacture where aluminum alloys are used extensively, that the scheduling of a symposium on precipitation hardening at the National Metal Congress in Chicago recently proved particularly timely and instructive. Eleven papers were presented on various phases of precipitation hardening, both in nonferrous and ferrous metals, at three sessions of the American Society for Metals, and they will prove to be invaluable groundwork for future investigators in this comparatively new field.

Hardening phenomena or changes in properties after heat treatment and aging of the "cipping" alloys, as Dr. Zay Jeffries suggests calling them, have intrigued both ferrous and nonferrous metallurgists for over a quarter of a century. To point the way for future research workers, a symposium on "precipitation hardening" was a high spot of the National Metal congress of the American Society for Metals in Chicago, Oct. 23-27. Herein are arranged abstracts of the 11 papers presented on the subject, the attempt being made insofar as possible to concentrate on the more practical phases of a highly theoretical metallurgical concept

The discussions were introduced by Dr. Zay Jeffries, technical director, incandescent lamp department, General Electric Co., Cleveland, who summarized the fundamental aspects of precipitation hardening and pointed to the need for an inventory of the "factual high spots" of the art.

Origin of Terminology

In the precipitation heat treatment of duralumin, after the alloy is worked, it is heated to about 500 degrees Cent. and cooled rapidly, then allowed to age at ordinary temperature for a few days, increasing tensile strength as much as 50 per cent, with substantial improvement in hardness and yield strength. In earlier days, duralumin came to be known as an "age hardening" alloy and later, when the precipitation treatments of other alloys were carried on at temperatures other than ordinary, the tendency remained to refer to the alloys as "age hardening" and to the precipitation treatment as "artificial aging."

To get away from the term "aging," the terms "dispersion hardening" and later "precipitation hardening" were evolved for alloys susceptible to the duralumin-type

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treatment. This general term, of course, covers the two main steps in the treatment which are called "solution heat treatment" and "precipitation heat treatment." Dr. Jeffries suggested a further contraction of these terms might be practical, and offered "sol" and "cip" as suitable abbreviations, and "cipping alloys" as a general term identifying this type of material.

In the words of Dr. Jeffries, "So many views have been put forward —some inconsistent with others— in an effort to arrive at an adequate explanation of the phenomena involved, that an appraisal of the theoretical aspects should be welcome. These are but a means toward achievement of the real goal, which is to so stimulate present and future workers in this field that more and better precipitation-hardening alloys may be made available for the use of mankind."

Extended abstracts of paper presented at the symposium follow.

Present Theoretical Aspects

The mechanism of precipitation from solid solution or the theory of age-hardening was reviewed by Robert F. Mehl, head of the department of metallurgy, and Lawrence K. Jetter, graduate fellow, department of metallurgy, Carnegie Institute of Technology, Pittsburgh.

They observed that the process of precipitation from metallic solid solution is of great industrial importance; it is also of unusual scientific interest, for the property changes accompanying precipitation often are exceedingly varied and complex and frequently difficult of explanation. Points of view on theory are diverse, resulting in part from the incompleteness of the data developed and in part from the incompleteness of the theory of the metallic state. Data originating from scores of investigators were summarized and an attempt made to appraise validity of theories and generalizations proposed.

The authors suggested that changes in mechanical properties are of little use in deciding among contending explanation of age hardening. With the little knowledge we now have concerning the elementary processes which determine such properties, and furthermore with the tendency of precipitating systems to pass in a continuous or semicontinuous way through a series of intermediate states, arguments based on mechanical properties and the manner in which these differ with differing aging treatments can have little significance.

The phenomena accompanying age-hardening are complicated. If, however, proper consideration is given to the complexities inherent in the process of precipitation from solid solution, from the evidence now available it appears that the changes in properties observed may be explained on the basis of precipitation alone without recourse to theories concerning a homogeneous pre-precipitation reaction.

Critical review of the published work on the aging of iron and steel was presented by R. L. Kenyon, research metallurgist, and R. S. Burns, research engineer, research laboratories, American Rolling Mill Co., Middletown, O.

Early literature on aging of metals and alloys is largely made up of descriptions of the subnormal behavior of various materials and the changes in properties which they exhibited when allowed to stand at ordinary temperature or when heated or worked at slightly elevated temperatures. One of the first of these accounts concerning the peculiar behavior of iron and steel was that of Daniel Adamson before the British Iron and Steel institute in 1878 in which he described his experiments on wrought iron, bessemer and open-hearth steel to determine the ductility under rapidly applied stresses, such as those resulting from the explosion of gun cotton. He found that working steel plates between 600 and 700 degrees Fahr. caused them to be brittle and also that the practice of cold punching holes in boiler plate caused brittleness around the holes.

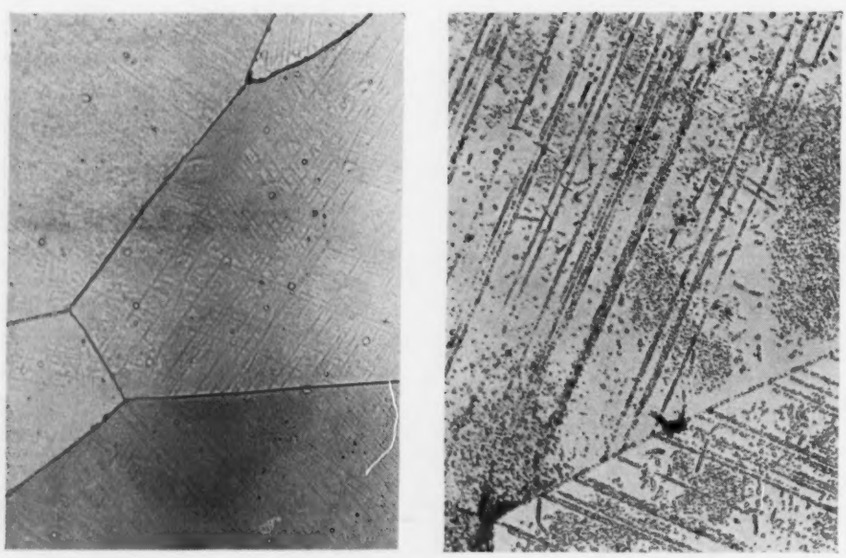
Ferrous Metal Considerations

There are really three types of phenomena to be considered under the general topic of aging of iron and steel:

1. The brittleness caused by deformation in the blue-heat range;
2. Strain-aging as shown by the changes in physical properties resulting from the storage of overstrained steel at room temperature or from heating of overstrained steel to moderate temperature (100 to 400 degrees Fahr.); and
3. Quench-aging or the property changes accompanying storage at room temperature after quenching drastically from elevated temperatures.

At first thought, a measurement of the changes in any property affected by the aging process should provide a means of determining the intensity of this effect and its rate of progress. Actually, many different procedures have been suggested and many different properties have been measured. The choice, in some cases, may depend on the property whose changes happen to be of greatest importance to the investigator. Some properties change little or are hard to measure accurately, or may be of little practical importance. It might be stated, then, that the material in question did not age with respect to that property. Other properties which change considerably upon aging greatly affect the usefulness of the material in industry, and in these cases aging becomes of real economic importance.

Similarity in the aging behavior of duralumin and quenched steel led to the prompt application of the same theory to steel as had been generally accepted for duralumin—precipitation hardening. The late Dr. Albert Sauveur said in 1931 that



First microstructural alteration in aging (left) of aluminum alloy with 5.17 per cent copper homogenized 20 hours at 540 degrees Cent., quenched in water and aged 30 minutes at 160 degrees Cent. X 100. At right is same alloy in advanced stage of precipitation, after aging 4 hours at 200 degrees Cent. X 500. From paper of R. F. Mehl and L. K. Jetter

ADVERTISING PAGES REMOVED

in aging of metals, particularly of steel, that two types must be considered: Aging after quenching and aging after cold deformation. He believed that quench-aging was caused by Fe_3C precipitation but did not believe that there was sufficient evidence adduced to prove that strain-aging was caused by precipitation after cold work.

The exact role played by various elements that, in binary systems with iron, could cause precipitation hardening, is somewhat uncertain. The interacting effects of one or more of these on each other when present simultaneously is also in doubt. The fact that drastic deoxidation reduces aging indicates that oxygen is an important factor—it is apparently the sole factor in strain-aging. In the case of quench-aging, carbon exerts a much stronger effect than other elements in the amounts usually present, and gives rise to the expression "carbon-aging." It is also still a matter of conjecture as to why overaging can occur in connection with quench-aging but not with strain-aging.

Conclusions Are Presented

Steels have been freed from the tendency to quench-age by removing the carbon before quenching. For this reason, it is logical to conclude that carbon is the "cause" of quench-aging. By the same token, various investigators have produced steels stable against strain-aging by sufficient deoxidation. Hence, it is concluded that oxygen is one "cause" of strain-aging.

Messrs. Kenyon and Burns introduced some 382 bibliographical references to research on aging phenomena.

Discussion of hardenable copper-base alloys, including their treatment, properties and commercial applications, was offered by D. K. Crampton, director of research, Chase Brass & Copper Co., Waterbury, Conn.

A noteworthy advantage of certain of the age-hardening alloys is that they may be forged, pressed or otherwise worked hot to substantially the finished form and size and subsequently treated to develop properties well in excess of those commonly exhibited by most alloys in the as-hot-worked state. This is particularly advantageous for larger sizes and complicated shapes. An excellent example of such use is in the making of large hot headed bolts.

While it is easy to cold head various cold-drawn, high-strength copper-base alloys in sizes up to perhaps ⅝-inch, it is difficult or impossible to do likewise with larger sizes. Even if the alloy could be produced in the desired strength in large sizes, which is usually impossible, cold heading equipment is seldom available having sufficient capacity and power for the purpose. If a bolt is hot headed from an ordinary non-age-hardening alloy, it will of course have a strength typical of that material in the annealed condition. Several age-hardening copper alloys are available which, when hot headed and subsequently heat treated, will show strengths about equal to the best obtainable from cold headed bolts made from smaller sizes of cold drawn wire.

An advantageous characteristic of age-hardening alloys in large sections is the greater uniformity of properties from center to surface than that found with a cold-worked alloy of the non-age-hardening type. Still another characteristic of the age-hardening alloys which makes them attractive for commercial application is their ability to maintain mechanical properties to moderately elevated temperatures.

There is an extensive field for copper-base alloys in the form of castings. In most cases the factors determining selection of the particular alloy are casting properties, machining qualities, corrosion resistance and strength and hardness. In addition to these properties, there are certain uses where either high electrical or high thermal conductivity, or both, are required. In the absence of a conductivity requirement, the field for age-hardening copper-base cast alloys appears limited. This is because most such requirements may be filled by certain of the non-age-hardening alloys at equal or lower cost.

Portion of steel stamping showing stretcher strains. These markings or Luders lines are surface irregularities due to localized or nonuniform deformation which takes place just at the transformation from the elastic to the plastic portions of the stress-strain curve. From paper of R. L. Kenyon and R. S. Burns

However, there is a considerable field for alloys to be used in the as-cast condition where a combination of high strength or hardness and either electrical or thermal conductivity is highly desirable. For certain electrical fittings, for instance, high strength and high electrical conductivity are necessary. For other uses, high hardness and high thermal conductivity are essential. Some 19 elements form copper-base binary alloys having the type of solid solubility which is a prerequisite to age-hardening according to the simple theory. Although many of these do not exhibit a marked or even a reasonably useful degree of hardening, all respond measurably to heat treatment within some range of composition.

More Complex Alloys Foreseen

It seems almost certain that there will be no new binary hardenable copper alloys having interesting properties at any reasonable cost, this part of the field having been pretty thoroughly investigated. Also, there seems little likelihood of many new ternary hardenable systems, at least such as would be suitable for wrought alloys, although there is perhaps a little greater probability in cast alloys. The direction in which developments may be looked for is in the more complex alloys and in modifications or refinement of presently known ones. Also, in the field of high strength, high conductivity alloys, there will probably be developments in the sequence of operations to develop the optimum properties available.

Four reasons can be cited to account for the present somewhat limited use of materials under discussion:

1. The furnace equipment available in copper and brass mills is not well adapted to the treatment of hardening alloys.
2. Certain of the age-hardening alloys are so susceptible to oxidation or to combination with nitrogen as to require very special handling in controlled atmosphere furnaces in order to prevent deterioration.
3. In spite of the great amount of data published on many of the alloys, information on the treatments best suited to bring out the optimum properties of each alloy in a variety of sizes and shapes is not complete.
4. Many of the alloys are of rather high mixture cost and, due to casting, working or heat treating difficulties, the fabrication cost tends to run higher than in most of the work-hardening alloys.

(To be concluded)

Boiler Advances

. . . to meet increasingly severe requirements of high-pressure high-temperature service are made possible by welding in boiler drums, drum connections, stud tubes and other important points as detailed here

■ THE USE of fusion welding in boiler construction has made possible boiler designs that otherwise could not have existed, especially in large-capacity boiler units designed for operation at high steam pressures and temperatures and having such components as continuous-tube superheaters and economizers, air heaters and water-cooled furnace walls.

The change in shop operations is particularly noticeable in the fabrication of boiler drums and other pressure vessels, not only because of the elimination of the riveted joint, but also because of the methods followed in forming and assembling the sections of these drums. At Barberton, O., plant of Babcock & Wilcox Co., drum plates may be formed either hot or cold, by pressing, by vertical rolling or by horizontal rolling, according to length and diameter of the shell section and thickness of the plate.

Completed drum may be of single-plate or multiple-plate construction, this being governed by the size of the drum and the thickness which, in turn, is determined by the pressure at which it will be operated.

Plates of ordinary thickness are formed on the usual horizontal rolls. Plates of extremely thick section are formed on one of several presses, or on vertical rolls, shown in Fig. 1. This set of vertical rolls is said to be the heaviest of its type ever built.

In forming large drums for high-pressure service on the vertical rolls, the shell is made up of several individual cylindrical sections. Each section usually consists of one piece of heavy plate rolled to a complete circle and having one longitudinal joint where the edges meet. These sections are joined together by circumferential welds to form a shell of required length. Then the heads are welded on.

One outstanding advantage in forming these heavy plate sections by rolling is that the section can be returned to the vertical rolls and trued up if found not true after welding.

Heavy Plate Offers Advantages

With either pressed or rolled-plate construction, sections of extra thick plate required to provide the necessary strength of ligament between the holes in the tube sheets may be welded to sections of relatively thinner plate in which no provision for holes has to be made, often an important advantage.

Drums of the Babcock & Wilcox steam-generating unit soon to be placed in operation at the Oswego, N. Y., station of Central New York Power Corp., are of this latter construction. This unit, shown by Fig. 2, is designed for a steam pressure of 1500 pounds per square inch and a temperature of 903 degrees Fahr. It has a continuous capacity of 900,000 pounds of steam per hour.

Some idea of the magnitude of the work involved in fabricating these large high-pressure drums may be gathered from the following data. The larger or steam drum shown at A is 66 inches inside diameter and has a minimum shell thick-

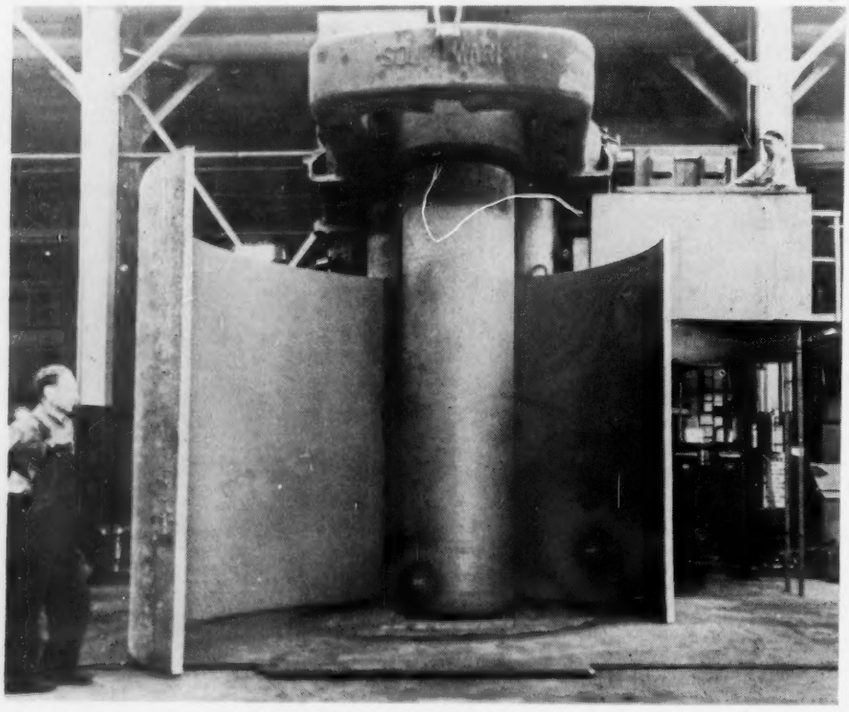


Fig. 1—Heavy vertical rolling equipment easily handles the extremely thick plates required in boiler drums. The machine shown here is said to be largest of its type

ness of 5 1/16 inches. Length of shell is 42 feet 11 inches. Overall drum length is 46 feet 8 inches. The smaller drum at B is 30 inches inside diameter, has a wall thickness of 2 9/16 inches, a shell length of 41 feet 10 inches and overall length of 44 feet 6 inches. Incidentally, the larger drum has 265 openings ranging from 4 to 24 inches in diameter, while the smaller drum has 142 openings varying from 3¼ to 24 inches in diameter.

In 1930, when the use of fusion welding was first officially approved for boiler drums, the thickness limit for riveted construction was approximately 2¾ inches. Even with the finest workmanship in these joints, leakage troubles were experienced at times. For pressures higher than those possible with riveted construction, forged drums were necessary—there was no alternative.

Two of the limiting factors in fabricating welded drums are the problem of examining the welds by radiography and the limit to which the steel mills can go in plate size. At the present time, 5 inches is considered the approximate maximum thickness that can be X-rayed with reliable interpretation, although gamma-ray examination may be employed satisfactorily for heavier thicknesses.

Technical Supervision Necessary

Needless to say, the welding of high-pressure drums and other pressure vessels must proceed under the most careful technical supervision. Successful use of welding in these applications is made possible only by two factors, of which the more important is adequate laboratory control, not only to establish the correct procedure to be followed but also to insure that such procedure is adhered to religiously. The second important factor is that there be a sufficient amount of production to warrant the cost of this laboratory control and preliminary research, thus making the entire enterprise practical.

Welding in the Barberton shop is done largely by automatic machines. In welding longitudinal joints, the drum remains stationary as shown in Fig. 3 while the arc is passed along the joint in successive passes. With circumferential joints, the arc is stationary and the vessel is rotated. Manual welding is used in forming irregular joints and for jobs where the amount of welding does not justify the expense involved in an automatic welding machine setup, such as nozzles, pads, flanges and lugs.

A significant development in water-cooled boiler furnaces made possible by welding is the Babcock & Wilcox stud-tube construction shown by Fig. 4. Here closely spaced steel studs are resistance welded end-on to the surface of waterwall tubes. These tubes and studs hold a plastic chrome-ore refractory lining in place to form the furnace wall.

Where hot wall surfaces are required to insure active combustion or to limit the heat input at vulnerable points, the stud tubes are fully studded and completely covered by the refractory chrome ore as at left in Fig. 4. In zones where high heat-absorption is desired, the furnace face of the tubes is bare as at right, Fig. 4. Then only the spaces between the tubes are filled

Fig. 2—Arrangement of drums, air heater, stud-tube walls, etc. in boiler unit built for Oswego station of Central New York Power Corp. is shown here. Unit to generate steam at 1500 pounds pressure, 903 degrees Fahr.

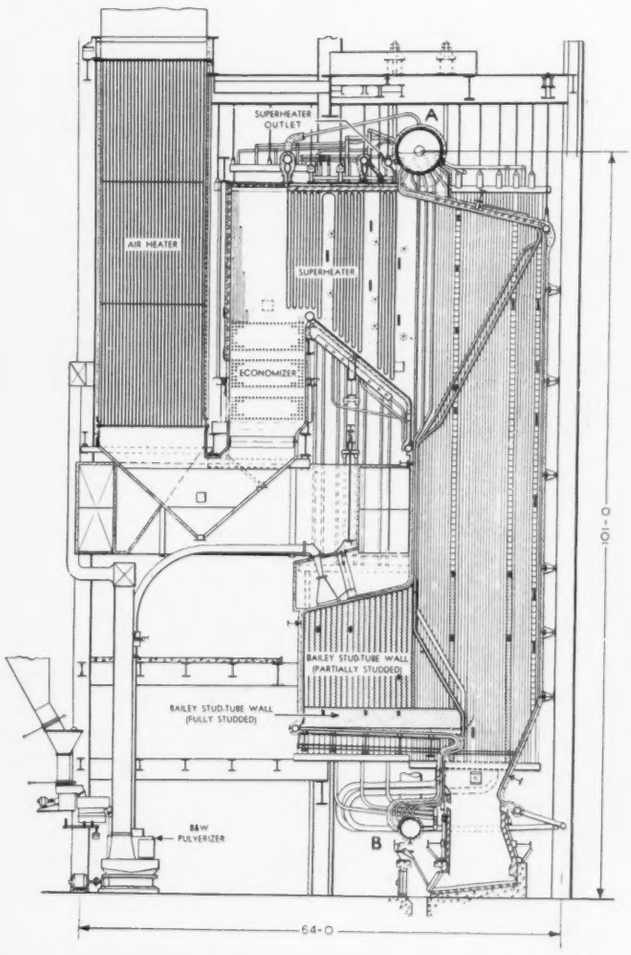
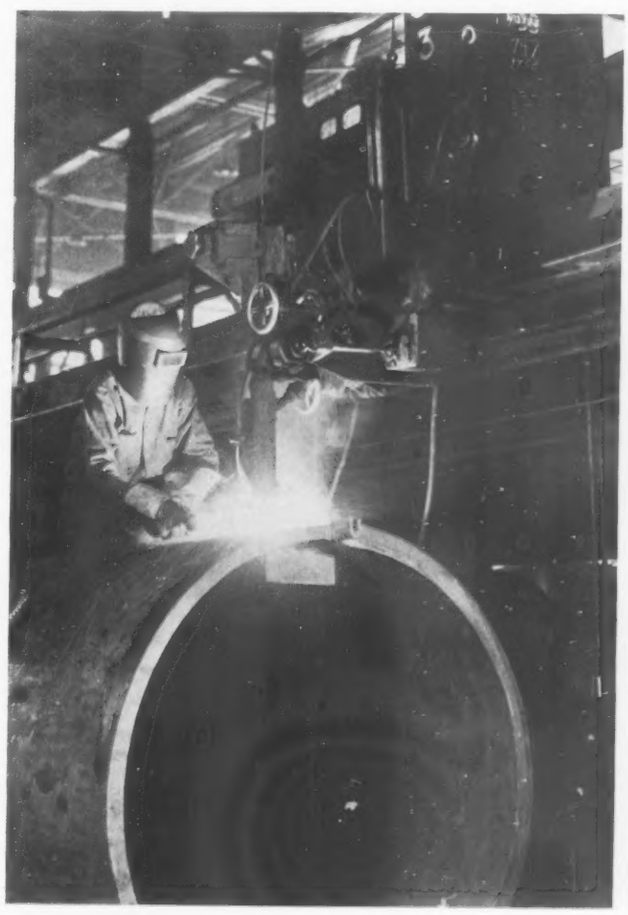
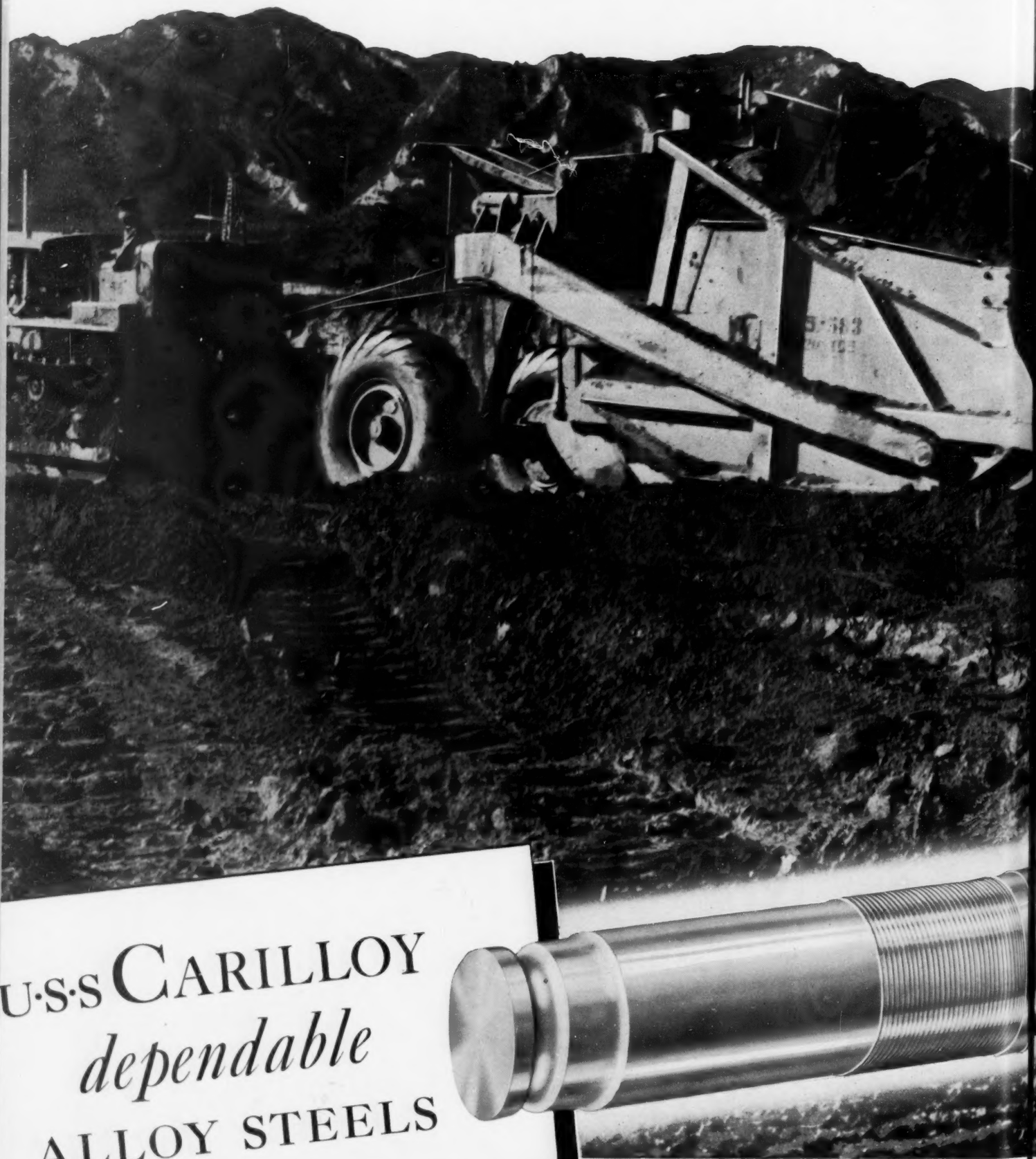


Fig. 3—Longitudinal seams are welded by automatic machine traveling lengthwise of seam. Circumferential joints are welded by rotating piece under the arc held stationary. Most all welding is automatic with speeds, current, etc. under careful supervision



In the *Vital Parts* o



U·S·S CARILLOY
dependable
ALLOY STEELS

# of a Record Breaker

Equipped with tough axles of U·S·S Carilloy Steel . . . monster scrapers move more yards per trip, per hour, per dollar

ON this big job contractor's profits depended entirely on cutting dirt-moving costs. To strip the dam site, the outlet works and dikes for the Prado Dam, Santa Ana River, California, 4½ million yards of earth had to be moved—and moved fast.

A fleet of 25-cu. yd. ultra-modern scrapers was put to work. Each rig completed the 2700-foot average round trip 7.5 times, moved 150 yards every hour. Loading time 1 minute 25 seconds. Fuel consumption, 35 gals. of Diesel fuel per 8-hour shift, better than 34 yards per gallon.

But speed was not the only essential in this work. Equally important were *stamina* and *dependability* in every part of the equipment. U·S·S Carilloy Alloy Steel—S.A.E. 4140—used in the axles which bear the brunt of the load, assures a wide margin of strength and safety in these vital parts.

In U·S·S Carilloy Alloy Steels we offer you dependable, highest quality alloy steels that assure the utmost dependability in the parts made from them. These made-to-measure steels are produced by specialists who make fine alloy steels and nothing else—and whose aim is to give you the exact grade of steel that will do the best job for you at lowest cost. We welcome the opportunity to put our whole story before you.

(Shown below, axle for 25-yd. unit.) Wooldridge "Terra-Clippers" are built in nine sizes from 4 to 25-yard capacity, in all of which U·S·S Carilloy Alloy Steel—S.A.E. 4140—is used for the axles. U·S·S Carilloy Alloy Steel—S.A.E. 4140—is also used for the shaft of gears in the power control unit and in heat-treated form, is used in the axles of the ripper as well as in the ripper standards. Illustrations, courtesy of the Wooldridge Co., Sunnyvale, California.

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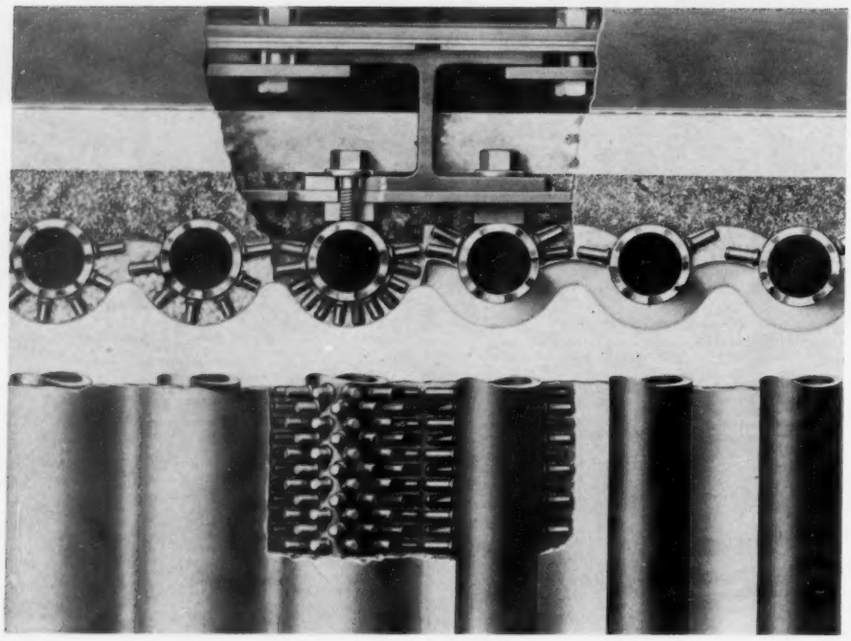


Fig. 4—At left, fully studded furnace-wall tubes. Right, furnace face of tubes are left bare here to give high heat absorption desired in certain sections of furnace. All studs resistance welded to tubes in automatic machines

with refractory held in place by the studs.

These studded tubes may be bent as required, the studs furnishing reinforcement for the refractory. This water-cooled stud-tube construction makes practical a small-volume furnace with resultant high efficiency and note-worthy savings in weight and space, of special importance in marine boilers.

Much thought has been given to developing the most efficient machines for welding these studs on the tubes by the electrical resistance method. Machines now in use automatically weld the studs to the tube and index the tube to the correct position for the next stud at a high rate of speed.

Specially Formed Tubing Used

The Oswego station boiler, Fig. 2, well illustrates the enormous amount of specially formed tubing in one of these large radiant-type units. The combined length of tubing in this unit is 115,000 lineal feet, made up as follows: superheater, 39,400 feet; economizer, 38,700 feet; main generating tubes, furnace wall and floor tubes, 36,900 feet. The furnace tubes have 690,000 studs resistance-welded to their surface.

Another type of construction in which the use of welding is of particular advantage is in forming and assembling of various ducts and special casings. Some of these units are most complicated in shape and would be quite expensive to construct were it not for the flexibility afforded by built-up welded construction.

Thus welding has made it possible for designers to create steam generating units that meet increasingly severe requirements in pressures, temperatures and space occupied as well as permitting economical arrangements of parts that otherwise would not be possible.

New Aluminum Flux

■ A new flux called "Amco" has been developed by American Solder & Flux Co., Wayne avenue and Berkley street, Philadelphia, for tinning aluminum as well as all other metals, including cast iron.

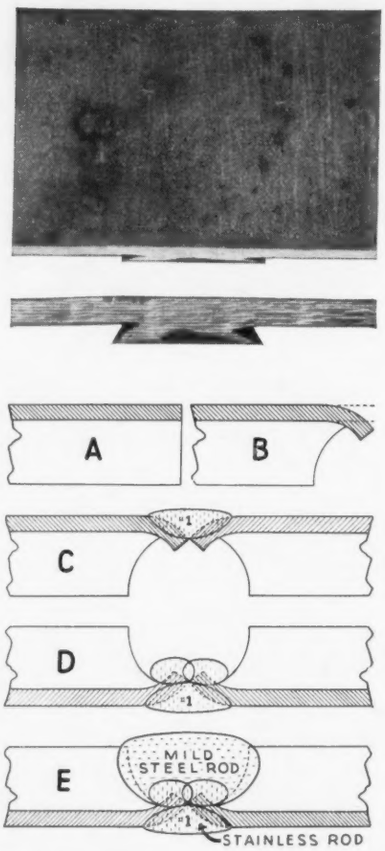
The flux dissolves the oxide on the metal to be soldered, also coats it with a metal on which ordinary tin and lead solder will adhere readily. If aluminum solder is used, the solder may be applied to the coated surface without any further preparation. The flux may be used with any clean source of heat as well as with an ordinary soldering copper.

New Method To Weld Stainless-Clad Steel

■ A low-cost method of welding stainless clad steel has been developed by Composite Steel division of Jessop Steel Co., Washington, Pa. It allows use of mild steel welding rods to weld the backing and is claimed not to affect the corrosion resistance of the weld zone.

At top of the accompanying illustrations is an unretouched photograph of a piece of stainless clad steel welded by the new method. After a 24-hour exposure to a 20 per cent salt spray mist, the piece shows no more corrosion in the weld zone than in adjacent parts of the piece.

Welding procedure is illustrated in the accompanying profile. The plate as supplied is shown at A, the lined portion representing the cladding. The plate then is scarfed and cladding bent down with a follow-up tool or hammer, as illustrated in B. Primary weld (bead No. 1 in C) is made at the juncture of the two claddings with a ⅛-inch diameter stainless steel coated rod. The two plates then are turned over and, using a 3/16-inch diameter stainless steel coated rod, secondary welds are made on the underside of exposed cladding as indicated in D. The completed weld is shown in E. Bead No. 1 then is ground flush with cladding.

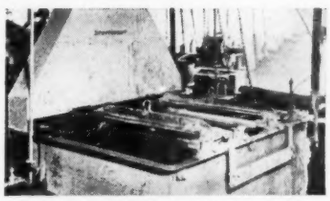


Shown at top is weld by the new method after exposure to salt spray. There is no more corrosion in weld area than in adjacent portion. Below, welding procedure

In all cases where rods are used, the rod should be richer in alloy than the cladding. Lowest possible amperage and fastest welding time are recommended.

JOE, YOU'RE NOT LOOKING SO GOOD LATELY

"No, Cora, I have been feeling rotten. I think it's those fumes at the plant."



Sturtevant Exhaust System for cyanide tank.

Sturtevant Grinder Exhaust System for carrying off emery and steel dust from grinding operations.

A HEALTH HAZARD such as this calls for *action.* Delay is likely to result in sad and costly consequences.

No matter whether your problem is one of removing fumes, dust, steam, or excess heat—Sturtevant can design a system for you which will effectively remedy the trouble.

Sturtevant Dust and Fume Removal Systems offer you many advantages. They assure you of a system exactly suited to your particular requirements—skilfully engineered—backed up by over 75 years of air engineering experience.

Write, briefly explaining your problem, and your inquiry will receive immediate attention.

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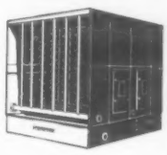
Puts Air to Work

Centrifugal Fans
A wide variety of types and sizes for exhausting or blowing service, including high pressure fans. Belt, motor, or turbine driven.

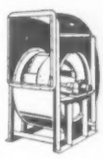
Air Washers
Made in several types and wide range of capacities to meet varying requirements in cleaning, cooling, dehumidifying, and humidifying air.



Air Conditioning
Individual units of equipment or complete central systems for maintenance of desired temperature and humidity in industrial air conditioning.

Drying Equipment
A wide variety of equipment for industrial drying in connection with textile, rubber, wood, leather, chemical, food, ceramic, and many other products.

Corrosion Resisting Fans
Rubber-coated and special metal alloy fans for acid fume exhaust service. Belt, motor or turbine driven.



Axiflo Pressure Fan
Can overcome resistance of ducts, filters, prevailing winds, etc., up to 1½ in. water gauge, and possesses mechanical efficiency of over 79%. 11 sizes ranging from 18 to 60 in., with capacities up to 75,000 c.f.m. Furnished with either belt or motor drive. Wheel of acid-resisting cast aluminum.

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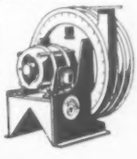
Propeller fan type, for wall or ceiling installation. Fin type heating element. For steam pressures up to 200 lbs., capacities up to 300,000 B.t.u.

Centrifugal Compressors
For industrial furnace, conveying and pneumatic tube work, gas boosting service, etc. Pressures: ½ to 5 lbs. Volumes: 50 to 50,000 cu. ft.



FOR DUST AND FUME REMOVAL

Make More Efficient Use of Plant Facilities; Expand with Caution

■ INDUSTRIAL preparedness was the keynote of the 1939 production conference of the American Management association held in Chicago, Nov. 15-16. More than 500 representatives of leading industries attended the meeting, the program for which was arranged by the association's production division. Addresses and discussions were focused upon the best possible use of existing plant facilities and provision for flexible expansion through the best choice of new facilities.

"To be prepared for grave responsibilities that may at any moment be thrust on him by outside forces, it today behooves the production executive more than ever before to keep abreast of every development that can add to better and speedier production at ever-decreasing unit costs," was the statement of Alvin E. Dodd, president of the association, 330 West Forty-second street, New York.

"It is these two considerations—the element of obsolescence and the element of growth—that have and will continue to require new production facilities in both buildings and machinery," it was stated by Raymond S. Perry, vice president, Ingersoll Milling Machine Co., Rockford, Ill., in the opening address of the conference. "They are also requirements that must be met each year regardless of business conditions. A high industrial level of activity will, of course, accelerate, and a low prosperity level will decelerate the degree to which these requirements are met. They will not in any way affect the fundamental need."

Expansion Like a Disease

"It seems to me that the best way to view an urge for expansion is to think of it as a dread disease, which if not quickly checked will ultimately consume you. After this consideration let us look at the origin of the urge for expansion. Is the growth of business competitive growth or industrial growth? Any company in a growing industry has a relatively easy decision, it seems to me."

Mr. Perry stressed the need for cautious and intelligent expansion when needed and pointed out numerous ways in which shipments could be increased by utilizing existing facilities more fully.

"How Does Building Design Affect Production Efficiency?" was the topic of Albert Kahn, president, Albert Kahn Inc., Detroit. Mr. Kahn pointed out advances in building design and techniques that made it possible to suit the building exactly to the job it had to do and described recent experiences with windowless buildings, all-glass buildings and prefabricated plants. He also discussed what could be learned from building layouts designed around a process and how executives can go about expanding facilities quickly without incurring excessive fixed investments.

The efficient operation of any plant, no matter how modern, will be affected by the factors of maintenance, employe efficiency, and operating efficiency of building services, and these should be carefully considered at the outset of any building program, according to H. K. Ferguson, president, H. K. Ferguson Co., Cleveland. His address revolved about the engineering of a plant to provide the best layout, the matter of modern and flexible electrical distribution, servicing of the plant with compressed air, gas, and water, and the effect of factory floors on operation and maintenance costs.

Flexibility Is Essential

"The emphasis in modern design is on flexibility," Mr. Ferguson told the conference, "which will make service available at any point required. On account of the pressure of better research, which is constantly evolving new processes, equipment and machines, production layouts are radically changed every year. To meet this condition, plant engineers are insisting that building services be universally available at almost any spot. This minimizes both the cost of the changeovers and the time which they require."

"Plants of Tomorrow" were described by W. J. Austin, president, Austin Co., Cleveland, who spoke of the Simonds Saw & Steel Co. plant at Fitchburg, Mass.; L. J. Jordan, chief engineer, Industrial Rayon Corp., who described his company's plant at Painesville, O.; and Robert D. Frick, plant manager, Campana Corp., Batavia, Ill., who discussed that plant's operating experiences.

The dinner-smoker was devoted entirely to the subject of the effect of war conditions on production management.

Continuation of the war will mean a continually increasing volume of production in American factories, which in turn will build up payrolls and thereby increase domestic consumption, it was declared by Harold V. Coes, manager, industrial department, Ford, Bacon & Davis Inc., New York.

"The upturn will be affected not only by the European war requirements as reflected by orders placed in this country, but also by our own rearmament program requirements, which will be quite substantial if the program is carried out, although some of them will probably be spread over several years," Mr. Coes stated. "We also have the effect of the current shifts in international markets," he added, pointing out that some foreign nations now would have to look to the United States for their supplies.

Most manufacturers do not want to make permanent additions to plants for war orders. "No one familiar with or experiencing the consequences of the last war can fail to realize that any substantial expansion of this country's productive equipment, except perhaps in specific cases, will involve serious problems of readjustment when hostilities finally cease," Mr. Coes warned, stressing that considerable expansion appears possible without the necessity for any substantial construction program. It was brought out that industrial expansion should be motivated by normal growth and requirements and not by anticipation of war business, and that industrial output first can be expanded by numerous factors other than actual construction of permanent new buildings and other facilities.

W. C. Brown, illuminating engineer, incandescent lamp department, General Electric Co., Cleveland, opened the Thursday morning sessions with a presentation of "Lighting as a Production Tool," demonstrating and discussing numerous pieces of lighting equipment that has made industrial illumination a production tool rather than a production auxiliary.

Applying Modern Equipment

Another important session of the conference involved solutions of production problems by application of modern heating, ventilating and air conditioning equipment. A. E. Stacey, Buensod-Stacey Air-Conditioning Inc., New York, traced the development of modernized equipment in this field, with W. B. Henderson, executive vice president, Air-Conditioning Manufacturers' association, Washington, discussing typical case problems. Some of these included rejection of parts in precision assembly because of moisture of operator's hands, errors in precision work because of expansion and contraction of precision gages, assembly trouble where parts are brought from different parts of

ADVERTISING PAGES REMOVED

a building where temperature varies, and condensation problems arising where indoor conditions are too humid. Solution of these cases lay in the utilization of modern heating and air treating equipment.

At a luncheon conference, Dr. Samuel S. Stevens, dean, Northwestern university, Evanston, Ill., discussed the relation of the total industrial environment to the well-being of the worker, pointing out how and why industrial engineers must consider the employes when they decide on factory layouts, production methods and general working arrangements.

Worker Protection Better Than Ever

The American worker is better protected today against occupational diseases, accidents and excessive fatigue than at any time in history, Dr. Stevens stated, proceeding to point out how all that had been done for the employe so far still is not sufficient and that a more healthy psychological environment must be created in order for employer and employe together to produce the maximum amount of goods at the lowest possible price for the good of all concerned.

Dr. Stevens cited the psychological value found in some cases in profit-sharing plans, in more chances for advancement, in opportunities to purchase stock, and particularly in the taking of the employe into the confidence of management that he may know the production and economic problems of the industry.

F. C. Houghten, director of research, American Society of Heating and Ventilating Engineers' laboratory, Pittsburgh, discussed the effect of atmospheric conditions on employe efficiency. To show the comparative effects of air-conditioned versus non-air-conditioned environments, Mr. Houghten presented results obtained from a careful study of groups made under simulated industrial conditions.

George F. Begoon, Westinghouse Electric & Mfg. Co., Cleveland, described new developments in solving industry's problems of dust and air pollution, presenting a history of air cleaning methods used in industry and presenting the latest electrostatic methods. He included case examples involving product improvement, recovery of valuable particles in the air, cost reduction through dust control, and improvement of employe health. Actual demonstration of an electrostatic unit also was made.

Simplified Practice

■ The current revision of simplified practice recommendation R29, Eaves Trough and Conductor Pipe, has been accorded the required degree of acceptance by the industry, and is to become effective Dec. 1, 1939, according to an announcement of the division of simplified practice, national bureau of standards, Washington. The revised recommendation will be identified as simplified practice recommendation R29-39.

The revision reduces sizes of eaves trough by the elimination of the 3½ and 8-inch sizes, adds a 1½-inch diameter plain round conductor pipe, and enlarges the scope of the recommendation to include box and roof gutters and plain ridge rolls. The revision also effects an elimination of about 200 items in eaves trough, ridge rolls, and their accessories, and materially reduces the variety of box and roof gutters in use.

Impact Cleaning Manual Covers Entire Field

■ *Impact Cleaning*, by William A. Rosenberger; cloth, 480 pages, 6 x 9 inches; published by Penton Publishing Co.; supplied by STEEL, Cleveland, for $7.

Impact cleaning is the modern term for the process formerly called sandblasting, when sand was the only abrasive available. Today, however, the author points out that effective results are obtained also from special steel abrasives. He also recommends the use of artificial abrasives, such as manufactured alumina, under special conditions and requirements.

The author, a recognized consulting engineer, has relied on his practical experience and his engineering training. He describes the type of equipment for all impact cleaning operations and discusses various problems at length.

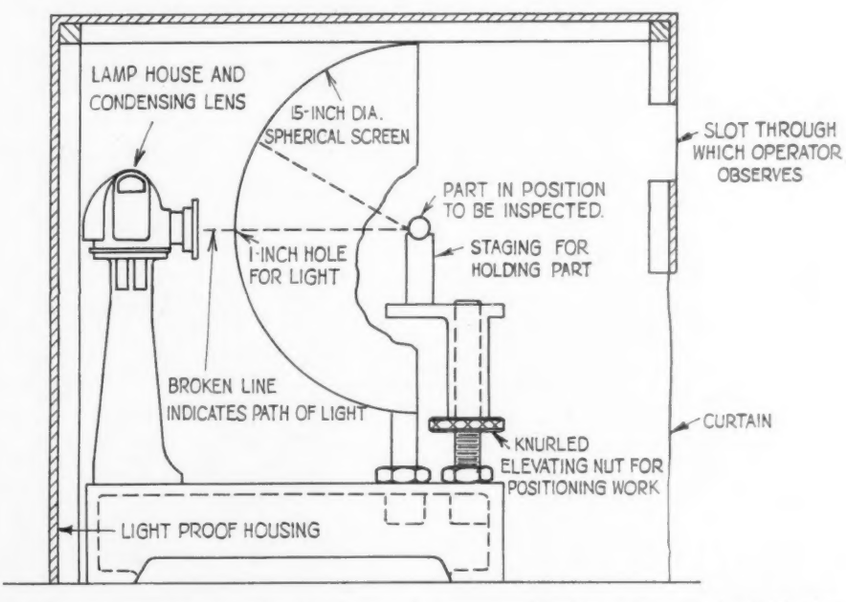
The volume is in three parts, which take up nozzle blast cleaning equipment, mechanical impact cleaning and ventilation of impact cleaning equipment.

The work is highly technical, containing over 160 formulas for various purposes. However, everyday problems are fully treated. There are 255 illustrations, uniform in treatment, reproduced from line drawings.

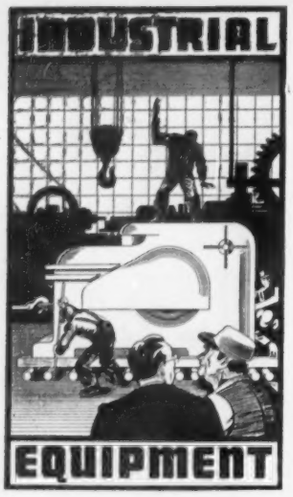
Of special interest are descriptions of impact-cleaning wheels, special devices for hurling abrasives upon the surfaces to be cleaned, replacing the usual air hose and nozzle.

The practical necessity and value of adequate ventilation and abrasive recovery are pointed out. Ventilation is necessary in any operation where dry abrasives are used and abrasive recovery is an economical factor. The book was written for those who design, manufacture, sell or use impact cleaning equipment of any form and contains a large fund of data covering every phase.

Spherical Surfaces Magnified for Inspection


LAMP HOUSE AND CONDENSING LENS
15-INCH DIA. SPHERICAL SCREEN
SLOT THROUGH WHICH OPERATOR OBSERVES
PART IN POSITION TO BE INSPECTED
1-INCH HOLE FOR LIGHT
STAGING FOR HOLDING PART
BROKEN LINE INDICATES PATH OF LIGHT
CURTAIN
KNURLED ELEVATING NUT FOR POSITIONING WORK
LIGHT PROOF HOUSING

■ **This comparator made by Jones & Lamson Machine Co., Springfield, Vt., shows how optical principles are applied to aid in the inspection of spherical surfaces. An enlarged true image of the inspected surface is projected onto a concave hemispherical screen and is seen by operator through slot at front of the machine. Magnification depends on the size of the work. The surface of a ¼-inch ball is magnified 60 times. Up to 1½-inch diameter spheres may be effectively inspected and a skilled operator is not required**



Roller Chain

■ A channel lubricated roller chain completely interchangeable with all other standard roller chains is announced by Morse Chain Co., Ithaca, N. Y. In this round pin chain, diagonal channels are rolled into the stock from which the bushing is formed. When the joint is assembled, these channels appear as spiral grooves and extend through the side plates of the bushing link.

Oil on the rollers quickly finds its way to bushing surfaces. The channels act not only as reservoirs but as paths for the flow of oil through the side plates and down to the pins, where the lubricant is seized and spread by capillary action in a protective film over entire contact surfaces of pins and bushings. In conjunction with the turning motion of

the rollers, the channels become in effect small pumps, literally forcing oil to all wearing parts of the chain.

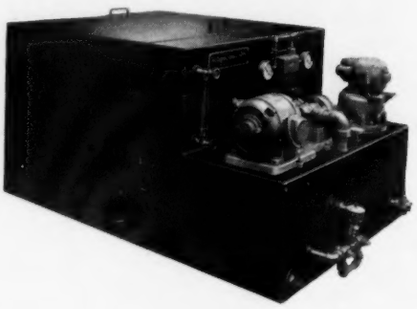
Rollers are hardened and ground, turned out of solid bar stock alloy steel to attain greater accuracy and wearing strength. Single, double, triple and quadruple widths, all standard pitches, and standard stock attachments are available in the improved Morse roller chain.

Force-Feed Lubrication

■ A complete line of assembled self-contained unit-pressure lubrication systems known as Unilube systems is announced by De Laval Separator Co., 165 Broadway, New York. These are compact, integral systems which furnish lubricant in streamline pressure supply to bearings or gear meshing points and incorporate in a single unit automatic full feed pressure filtration and automatic temperature and pressure control of the lubricant distributed.

System is suitable for reduction gear drives, pinion stands, roll neck bearings, large motors and motor generator sets, and other machinery for which force feed, pressure lubrication is desirable. Unilube is available in three types—single, double and dual—all handling any range of oil viscosities, including oils having a viscosity of 2400 S.S.U. at 100 degrees Fahr. Capacity of each type ranges from 1 to 30 gallons per minute. Unilube is complete with baffles, level gages, single dial thermometer and steam heating coil thermostatically controlled, pressure filter and pumps, all completely piped and mounted on a welded steel tank.

Advantages of this system include: All oil supplied to bearings or gears is filtered automatically

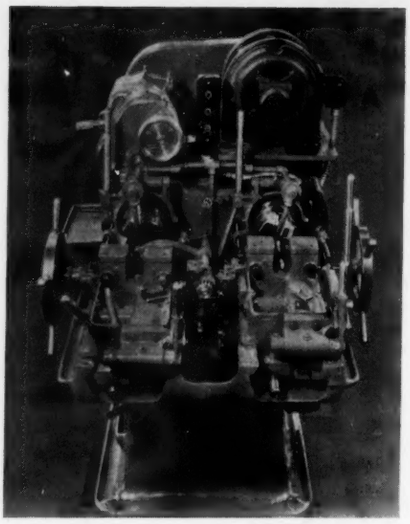


and mechanically. System is furnished and shipped completely assembled and ready for operation. Installation is easy, it being necessary only to make power supply, steam and oil connections. Being preasssembled, it is as compact as possible. Pump and filter being integral with the tank eliminate complicated and expensive individual foundation pads and interconnecting piping. Price is low enough for small user.

⅞-Inch Turning Machine

■ Landis Machine Co., Waynesboro, Pa., offers a ⅞-inch turning machine for a combination pointing, beveling, turning and facing operation. The machine is the standard Landis ⅞-inch, double-head, threading machine equipped with leadscrews and with ⅞-inch Lanco hardened and ground heads. To this standard machine have been added milling cutters, which replace the usual chasers; a spring actuated tool holder to carry the pointing and beveling tool (two of these special tools are shown on the right hand carriage of the machine); and the automatic work stop for positioning work in the vises.

Pointing and beveling tools are carried in a holder which extends through spindle. This tool holder



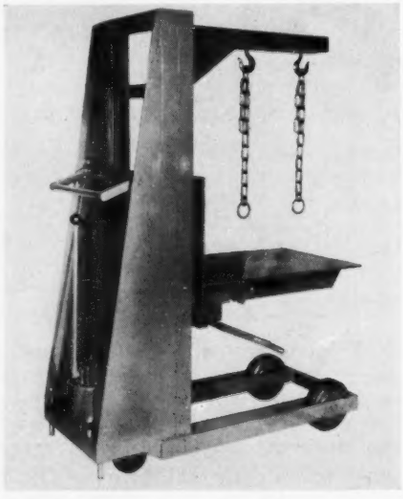
can be adjusted, at rear of the spindle, to permit turning, pointing and beveling of work for a length of 5 inches.

The four milling cutters operating in a single plane about the axis of the work are said to assure a uniform cutting action which produces a perfectly round turning job. Machine can also be used for threading if desired.

Die Handling Truck

■ An adaptation of the cantilever type of Lyon truck with hydraulic elevating table is being put on the market by Lyon Iron Works, Greene, N. Y. It has a die separating and turning device and a special adjustable clamp for holding various size dies. A winch for pulling dies on and off the table is mounted on the under side of the table and elevates with the table. Winch is operated by a removable hand crank.

Truck is of the castered steer type and equipped with a brake to hold the truck in position. Rear wheels are roller compound rubber tired and caster wheels are hard rubber



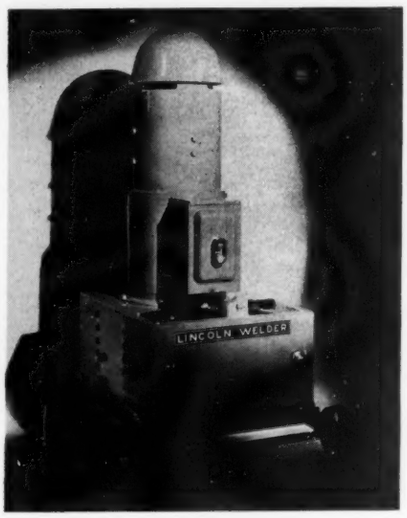
tired. A two-speed Lyon hydraulic pump provides low speed for elevating heavy dies and high speed for lighter dies or when elevating the table empty.

Various specifications are available. Truck shown has 2000-pound capacity with table 24 x 36 inches, lowered height of 15 inches and elevated height of 45 inches.

200-Ampere Arc Welder

■ A new 200-ampere arc welder of the Lincoln Junior type with a range for many welding applications ordinarily associated with considerably larger welding equipment, is announced by Lincoln Electric Co., 12818 Coit road, Cleveland. It is claimed to weld virtually all metals and alloys and to do hard facing work.

Welder is of the single-operator, variable-voltage type and can be used with either bare or shielded arc type electrodes. It has a cur-



rent range of 60 to 250 amperes for welding duty. Dual continuous control permits independent adjustment of voltage and current, giving complete and separate control of arc heat and arc penetration. Use of Class B insulation at proper points allows unit to withstand sustained overloads.

Armor-Clad Lighting Unit

■ An extremely rugged lighting unit, Steelite, designed for the severest service conditions is announced by Benjamin Electric Mfg. Co., Des Plaines, Ill. Housing is drawn from heavy-gage steel and has a contour to afford greatest strength and protection against shocks and blows. Housing finish is a fused-to-metal coat of porcelain enamel over which is acid resisting, baked-on, synthetic enamel.

Herculite heat, cold and impact-resistant glass cover is said to be absolutely unaffected by extreme

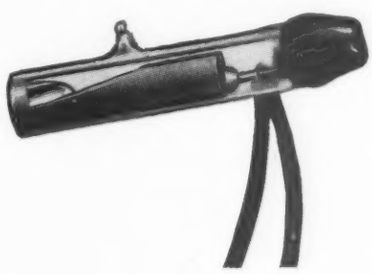
temperature changes. A 1½-pound steel ball can be dropped from a height of 7 feet without breaking or shattering the glass. Should the glass be broken, it disintegrates into tiny blunt fragments and not into dangerous splinters. Reflector interior is dust-tight and vapor-proof.

Mercury Switches Have Delayed Action

■ Delayed-action mercury switches added to the standard line of Konnec-tor mercury switches by the lamp department of General Electric Co., Schenectady, N. Y., are available with time-delay intervals of from ½ to 15 seconds for circuit-opening and from ½ to 10 seconds for circuit-closing.

The new switches are small and of approximately the same size and external design as conventional mercury switches. They may be operated either mechanically by means of a lever or cam action, or electrically by means of a solenoid.

The delayed-action is obtained by the restricted flow of mercury through a small orifice at the bottom of a metal chamber inside the



switch. Definite nonadjustable time intervals are built into the individual switches by varying the amount of mercury and the size of the orifice.

Hermetically sealed in glass and having no external metal contacts subject to wear or corrosion, the switches may be used in moist or corrosive atmospheres.

High-Temperature Valve Has No Bonnet Joint

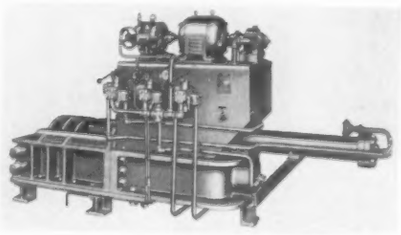
■ The "No-Bonnet-Joint" steel valve announced by Hancock Valve division of Manning, Maxwell & Moore Inc., Bridgeport, Conn., is claimed to end leakage through the gasket joint between the valve body and bonnet at elevated pressures and temperatures since the stellite seat is welded to the valve body,

eliminating threads. Valve disc also is heavily stellited to resist wire-drawing and wear. Made for pressures up to 2500 pounds at 1000 degrees Fahr., these valves weigh less than one fourth as much as conventional bolted-bonnet valves of the same size and pressure rating.

Valves are made in one basic size and then tapped or bored for welding for ½, ¾ and 1-inch pipe. They are recommended for handling explosive fluids where the hazard of leakage through a bonnet gasket might be dangerous.

Baling Press

■ Hydraulic Press Mfg. Co., Mount Gilead, O., offers a scrap metal baling press consisting of a box built up of heavy ribbed castings locked together. The box is closed by a massive hydraulically operated lid which slides in ways in the box. Inside the box are two horizontal-acting hydraulicaly operated platens, one traversing from the end and the other from the side of the box toward a forward corner. Slid-



ing lid, platens and inner walls of box are surfaced with removable steel wearing plates.

Trimmings, punchings, or similar scrap metal are placed in box section of the press. After box has been filled, the sliding lid which forms the top of box. is closed by hydraulic pressure. As soon as lid is closed, the preliminary pressing platen moves toward end of box. When this platen has reached the end of its travel, the side baling platen moves forward, compressing scrap into finished bale.

All of the hydraulic actions are manually controlled.

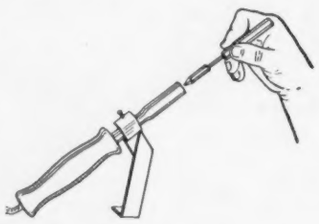
Heat-Treated Gears

■ A complete line of gears, heat treated by the Barnes process for heavy-duty industrial application, is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. These gears are designed for use under adverse operating conditions such as in cranes, mine hoists, locomotives, and in rubber, flour, cement, quarrying and metal-mining machinery.

Heat treatment is said to give gears a hard wearing surface, tapering off on the inside to an extremely tough core to produce long wearing gear teeth and high shock resistance. Gears ordinarily have approximately four times the life of an untreated gear or pinion under same service and operating conditions. Rate of wear is nearly constant throughout useful life.

Small Soldering Iron

■ Electric Soldering Iron Co. Inc., Deep River, Conn., offers a regular Esico No. 54P or No. 96P soldering iron, fitted with a bracket to hold the iron on the bench, with a pencil

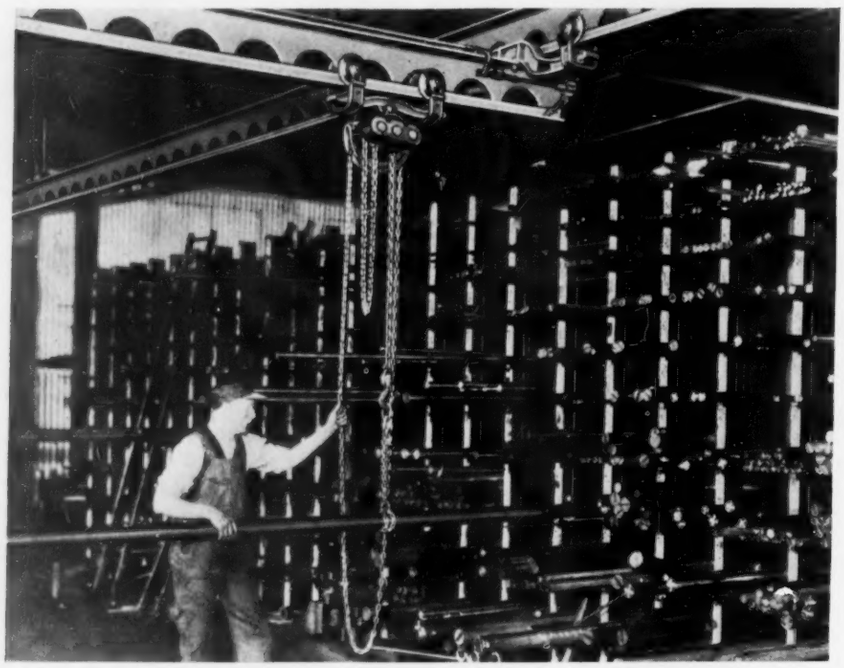


iron inserted in the place of the regular tip ordinarily used. The unit heats the pencil iron quickly and keeps it at the proper temperature for instant use.

Press Draws, Tapers

■ Hydraulic Press Mfg. Co., Mount Gilead, O., announces shell drawing and tapering press with mechanical ejector under tapering press bed and a hole through center of drawing press bed through which the drawn shell is pushed and stripped from the punch.

Pressing surfaces are 30 x 30 inches, maximum daylight opening between slide and bed is 132 inches and maximum ram travel is 120 inches. Other standard sizes are available.



HANDLE STEEL STOCK THIS EASY WAY

The work of handling steel stock is made so easy with a simple hand-operated Cleveland Tramrail System.

Because heavy lifting and tugging is eliminated the stock man is able to handle more steel and feel fresher at the end of the day. Further, he can handle it alone, without help.

Cleveland Tramrail is lightening the work and simplifying the stock handling problem in many steel warehouses. Simple hand-operated or complete electrified systems are available.

There is a Cleveland Tramrail dealer near you ready to supply the details.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 Depot Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

New Parts Plant

(*Continued from Page* 52)

use in production work. Such work is done with steels ranging from 0.65 to 1.25 per cent carbon and 3.75 per cent chromium. In addition, a certain amount of production work is done on various items such as screws, bolts and washers, which are case hardened in a cyanide bath at 1500 degrees Fahr. In most instances, a medium case is desired, but on work which is to be electroplated the case is quite light. Also, a wide variety of springs is heat treated in this department.

At left in Fig. 2 is shown a lead bath for work up to 1500 degrees Fahr. This unit has a 20-gallon pot. The low rectangular tank immediately adjoinng it is a water quench.

Just to right of this unit is a cyanide bath of 75-pound capacity for work up to 1500 degrees Fahr. The large furnace just past this is electrically heated and has a hearth 11½ inches wide and 30 inches deep. It is employed in handling work up to 2000 degrrees Fahr.

There are three other units beyond this in the lineup shown in Fig. 2. The first is a high-speed gas-fired furnace, also with a hearth 11½ x 30 inches and capable of handling temperatures up to 3000 degrees Fahr. Usual temperatures employed range around 2350 degrees Fahr.

Next unit is for carbonizing work and is a gas-fired furnace with a hearth 18 inches wide and 45 inches deep and capable of operating up to 2400 degrees Fahr. Last unit in this row is an annealing furnace, gas fired, 30 inches wide and 5 feet deep. Usual temperatures employed here are 700 degrees or lower.

Opposite this row of furnaces is a salt brine tank, a water tank, an oil quench and an automatic electrically heated oil draw furnace operating up to 550 degrees Fahr. Other equipment included in this department consists of a brazing bench, a gas heater for forging work and a small gas-fired high-speed furnace for tools.

Machining to Close Tolerances

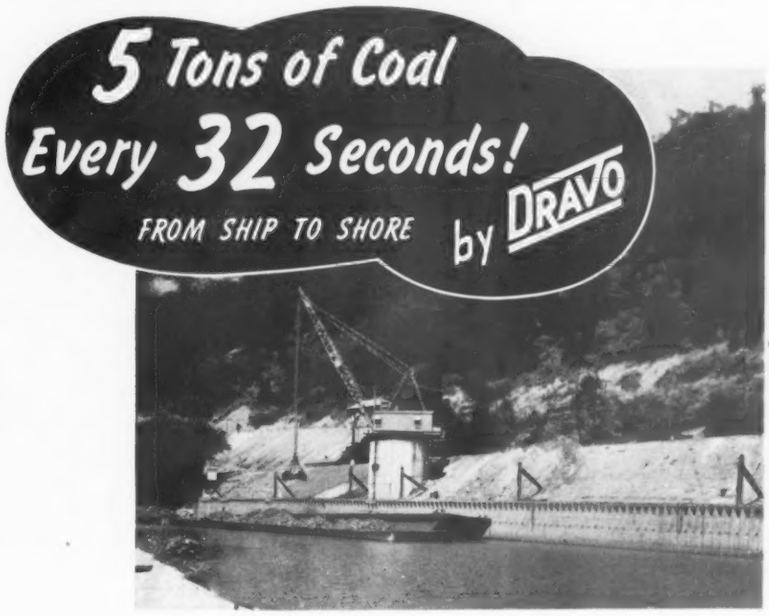
Much of the machining work in this plant must be done to extremely close tolerances to meet the exacting demands of lens mountings for microscopes and similar delicate instruments.

To handle such work, latest type precision machine tools are employed. Among the unusual units found here is the Swiss jig-boring machine shown in Fig. 4. This machine is especially useful as all adjustments are precalibrated with vernier direct-reading dials to facilitate operation of the machine. It is used principally for making tools subsequently employed in production work.

Another unusual feature of the new plant is the completely automatic boiler plant, a view of which is shown in Fig. 5. This type of plant is quite new, only a few being in existence. Two boilers are employed, each rated 176 horsepower and operating at a pressure of 10 pounds per square inch. These boilers not only furnish steam which is distributed to unit heaters at points in the main plant and adjoining rooms, but also furnish steam employed in heating water for plating tanks, rinse tanks and similar processing work.

Each boiler is fired with one nozzle-type burner, employing No. 6 furnace oil as the fuel. This is an extra-heavy oil and is preheated by means of a hot water line surrounding the line leading to the 10,000-gallon storage tank placed outside the building. This raises the temperature of the oil to about 170 degrees Fahr. at the burners. Temperature of tank is maintained at 110 degrees Fahr.

All controls are electrically operated. The plant is designed to be completely self-contained and to op-



THE Pittsburgh Coal Company's Smith Ferry Dock has ample barge accommodations to insure uninterrupted operation. A Dravo whirler mounted on the shore swings a five ton bucket from ship to shore and back to ship again in 32 seconds, which is moving coal in a hurry, as any dockman will say. A fast, simple, effective rig, it enables the Pittsburgh Coal Company's Smith Ferry Dock to enjoy an unusually low handling cost per ton.

Whether the problem is one of modernizing old equipment, replacing obsolete handling machines or designing special facilities to meet new problems, consultation with Dravo may prove to be of great value to you. Added to its ability to fabricate and erect structures such as shown here, Dravo Corporation has had years of experience building docks, retaining walls, plant foundations—everything that enters into the problems of terminal facilities. Bulletin 403 describes docks, mill foundations and terminal equipment. Bulletin 202 describes revolving cranes. Either will be sent upon request. Inquiries relative to specific problems may be addressed to

DRAVO CORPORATION
ENGINEERING WORKS DIVISION

SHIPYARDS: PITTSBURGH, PA.—WILMINGTON, DEL.
GENERAL OFFICES AND SHOPS: NEVILLE ISLAND—PITTSBURGH, PA.

erate without attention. When there is little or no load on the boilers, the burners are shut down automatically. As the load rises, first one boiler is cut in with low flame. Firing is increased automatically as the load requires. As maximum capacity of the first boiler is reached, the second boiler cuts in automatically. Similarly, as the load decreases, the boilers shut down by themselves.

Every safety device is incorporated in the equipment. A photoelectric eye is arranged to shut down the burner in event smoke accumulates in the furnace, indicating incomplete combustion.

Fig. 5 shows the rear, or burner, end of both of the two boilers as well as the hot water storage tank used with the system. Even maintaining the proper height of feed water in the boiler is done automatically. Sufficient space is available in the boiler room for addition of two more units, doubling the capacity of the plant.

In addition to the departments mentioned above, there are plant offices across the west end of the building. On the second floor above this area are the production engineering and drafting rooms where special development work is done.

Capacity of Plant, Not Furnace, Is 4000 Tons

■ In the report of the autumn meeting of the refractories division, American Refractories society, at Conneaut Lake, Pa., Sept. 8-9, appearing in STEEL for Sept. 18, brief reference was made on page 120 to a paper which W. B. Boggs, smelter superintendent, Noranda Mines Ltd., Noranda, Quebec, contributed on refractories being used in copper smelting furnaces in this plant. The statement was made that "a reverberatory furnace, 25 x 112 feet, will smelt 4000 tons of ore per day."

A communication from the author reveals that this statement was incorrect; the *whole* plant and not *one* furnace has a daily capacity of 4000 tons. To correct this misinformation and to make the exact situation clear, STEEL presents the following statement from Mr. Boggs:

"The copper smelting plant consists of a crushing plant (capacity 500 tons per hour); 10 Wedge roasters (25 feet in diameter); two reverberatory smelting furnaces (113 feet long x 29 feet 9 inches wide, outside walls); four Peirce-Smith converters.

"The two reverberatory smelting furnaces were originally 104½ feet long x 29 feet 9 inches wide and were built to smelt 500 tons of solid charge per furnace day. Briefly, by raising the roofs, enlarging the gas outlet flues, changing the roasters to obtain hotter calcines, improvements in the preparation of the pulverized coal and better control over firing conditions, each of these furnaces now regularly smelts 1500 tons of solid charge per furnace day. There is an appreciable tonnage of siliceous ore smelted in the converters in order to flux the iron. Consequently, the whole plant on some days treats over 4000 tons of new metal bearing material."

"Dry" Furnace Practice

(*Concluded from Page* 46)

Curve 3, Fig. 7, likewise exhibit savings from reduced blowing-engine horsepower. The amount saved, however, is something between the before and after-compression condensation plants.

Operating cost at 3 grains on this curve is believed too high, this point being result of pushing the use of 85-degree cooling water too hard. If mechanical refrigeration be substituted in part, beginning at some lower dew point, the operating cost between 3½ and 2 grains would more nearly follow the dotted line shown tangential to the two sections of this curve. It is believed costs below 2 grains also are somewhat high and that for other types of dehydration plants than the one considered, lower costs could be enjoyed.

Performance of this type of plant is quite sensitive to temperature of cooling water. Extra load imposed upon stoves based upon 1300-degree blast is approximately 4 per cent.

Overall Costs

Fig. 8 is summation of capital charges and operating costs. It therefore provides the overall picture and the perspective. It points the way not only toward the choice of type of plant but also toward selection of the most economical dew point for that particular type of plant.

Its accuracy and scope are such as to provide a sound basis for determining economics of dry blast.

It shows that while saving in coke per ton of iron falls off as the dew point is lowered, cost of removing a ton of water from the wind also diminishes.

Studies Evolution of Gas From Solidifying Ingots

■ A clear picture of the solidification of rimmed steel and killed steel ingots was drawn by Dr. John Chipman, Massachusetts Institute of Technology, Cambridge, Mass., speaking before 125 members and guests of the Detroit chapter American Society for Metals Nov. 13. Citing the experiments with a number of rimmed steel ingots, Dr. Chipman showed how the rate of gas evolution during solidification was determined to be directly proportional to the rate of solidification or the percentage of the ingot cross section solidified. Steel hoods were fitted over the tops of freshly poured ingots and the evolving gas collected to determine rate of flow and analysis. In 5-ton low-carbon ingots, gas evolution ranged from 35 to 80 cubic feet per ingot, only a small amount (1/137th part of the total volume) remaining in the ingot after complete solidification. The gas analyzed about 87 per cent CO, 7-9 per cent CO_2 and the balance hydrogen, nitrogen and hydrocarbons—this in a steel containing 0.04 per cent carbon by analysis.

It was postulated that evolution of CO gas would have an effect on the carbon content of the solidifying steel, so samples were dipped from the central portion of the ingot during various stages of solidification and analyzed for carbon. In one ingot carbon dropped from 0.042 to 0.025 per cent after 20 minutes of solidification. Other elements showed similar changes, but to a lesser extent, metallics such as manganese exhibiting little change from the outer edge to the center of the ingot.

To obtain a definite measure of segregation, pieces were cut from the bottom, middle and top of an ingot and then vertical slices made at ½-inch intervals from the skin, and analyzed for various elements such as carbon, manganese, copper, sulphur, oxygen and nitrogen. Curves were drawn to show the changes in percentages of these elements from the skin to center of the ingot. Greatest extreme was shown by oxygen, followed in order by carbon, sulphur, nitrogen, copper and manganese.

Dr. Chipman presented an interesting analysis of blowhole formation in rimmed steel, and observed much work remained to be done.

Color Matching Discussed

■ "Colors and Their Matching" by Roger K. Taylor, a pamphlet published by Porcelain Enamel & Mfg. Co., Eastern and Pemco avenues, Baltimore, is a brief discussion of color and the procedure for matching. In summarizing, the author states that the spectrophometer offers by far the most complete information for the matching of colors; but that if visual inspection is employed it should be done under an illumination similar to that in which the materials are to be used, that samples should be the same size and held close together on the same background. Copies of the pamphlet may be had from the publishers.

Steel Needs Heavy; Forward Buying Off

Sustained Schedules In Prospect at Least Next 60 Days

MARKET IN TABLOID ★

Demand
Generally steady or heavier; November bookings down.

Prices
Unchanged; scrap continues to weaken.

Production
Steady at 93½ per cent.

■ THE holiday interruption had little effect on steel demand, while ingot production held at its recent peak of 93½ per cent.

Orders this month will be well below the October total but are sufficiently close to the volume of shipments to prevent any marked shrinkage in backlogs. Unfilled business will support heavy operations through January, and additional buying is in prospect when first quarter prices are named, probably within the next ten days.

Backlogs vary in different products, bars and flat-rolled steel being sold ahead most extensively. On the other hand, structural shapes are available for shipment before the end of the year, and plate deliveries also are improved.

Approach of the inventory-taking period is without influence on steel shipments, consumers and distributors still pressing for material to meet current needs. Consumption is expanding in some directions and is well sustained in others.

Railroad equipment builders are swinging into production of heavy orders booked recently, with a stimulating effect on steel releases. Farm equipment manufacturers, starting a new fiscal year, are optimistic regarding the outlook and expect a 25 to 30 per cent sales gain in the ensuing 12 months. This is reflected in current operations of implement and tractor builders.

The automobile industry is enjoying active retail sales which are preventing dealer stocks from accumulating rapidly and which will support relatively heavy production for at least the next 60 days. Assemblies still are restricted by idleness of Chrysler plants, and last week's output was also curtailed by the holiday which reduced the total 14,180 units to 72,520 cars and trucks. General Motors cut from 48,180 to 40,240, Ford from 22,615 to 18,600 and all others from 15,905 to 13,680. Higher schedules are indicated this week.

Relatively few inquiries for freight cars, locomotives and track material still are active. However, equipment interests have heavy backlogs, in some instances sufficient to keep plants busy for six months. Shipbuilders also are booked for months ahead.

Steel producers shortly are expected to be in a position to accept a larger amount of export business. Possibility is seen that foreign buying will take up much of what slack develops in domestic demand early next year, although this view is subject to European developments. Export prices on some products have been shaded lately in an attempt to attract business.

Fabricated shape and concrete reinforcing bar markets are less active in both awards and inquiries. Small industrial plant extensions are fairly numerous, and private building as a whole shows improvement, but the rush to close on pending and prospective work in September and October has removed a large amount of potential business from the market. Concrete bar backlogs will require heavy shipments into next quarter.

Unfilled business in tin plate is well sustained, despite capacity production. Improved demand for containers in recent weeks is preventing large inventory additions of tin plate by canmakers.

Scrap markets retain an easy tone in most districts, and the price composite is off 8 cents to $19.50. England has placed orders in this country for 750,000 to 800,000 tons of scrap, including 150,000 to 200,000 tons on old orders that had not been completed when war started. The decline in buying for export has been given responsibility for price weakness in some eastern areas recently, although lower quotations have been general throughout the country.

Pig iron shipments reflect steady operations among most foundries, despite a seasonal slackening in certain types of work and the lag imposed on the automotive industry by labor trouble. Merchant iron supplies are adequate, and needs of steelmaking iron generally are being well covered.

Some steelworks are encountering delays in readying additional open-hearth furnaces for service. This situation and the necessity of closing active units for repairs account for inability of the industry to move ingot output immediately to theoretical capacity. Only two districts scored gains last week, Chicago and Buffalo both being up 2 points to 95 per cent.

Offsetting these gains were reductions of 5 points to 90 at Detroit, 1 point to 86 in eastern Pennsylvania, 4 points to 84½ at Cincinnati and 2 points to 88 at Cleveland. Unchanged were Pittsburgh at 94, Wheeling at 93, Youngstown at 90, New England at 100, Birmingham at 94 and St. Louis at 81.

COMPOSITE MARKET AVERAGES

	Nov. 25	Nov. 18	Nov. 11	One Month Ago Oct., 1939	Three Months Ago Aug., 1939	One Year Ago Nov., 1938	Five Years Ago Nov., 1934
Iron and Steel	$37.42	$37.44	$37.53	$37.62	$35.95	$36.39	$32.15
Finished Steel	55.90	55.90	55.90	55.90	55.60	56.68	54.00
Steelworks Scrap..	19.50	19.58	20.33	21.45	15.30	14.58	9.82

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 25, 1939	Oct. 1939	Aug. 1939	Nov. 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.25
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Terre Haute, Ind.	2.15	2.13	2.05	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15-2.40	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.00	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.00	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.10
Wire nails, Pittsburgh	2.55	2.50	2.40	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to 9/32-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	Nov. 25, 1939	Oct. 1939	Aug. 1939	Nov. 1938
Bessemer, del. Pittsburgh	$24.34	$24.34	$22.34	$22.34
Basic, Valley	22.50	22.50	20.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	22.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	22.21	22.21
No. 2 foundry, Chicago	23.00	23.00	21.00	21.00
Southern No. 2, Birmingham	19.38	19.38	17.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	20.89	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	23.215	23.215
Malleable, Valley	23.00	23.00	21.00	21.00
Malleable, Chicago	23.00	23.00	21.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	28.34	28.34
Gary forge, del. Pittsburgh	23.17	23.17	21.17	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$21.25	$23.15	$16.15	$15.15
Heavy melt. steel, No. 2, E. Pa.	18.75	20.00	14.40	12.75
Heavy melting steel, Chicago	17.25	19.25	13.75	14.20
Rails for rolling, Chicago	20.25	21.90	17.75	17.40
Railroad steel specialties, Chicago	21.25	21.75	15.50	16.10

Coke

Connellsville, furnace, ovens	$5.00	$4.75	$3.75	$3.75
Connellsville, foundry, ovens	6.00	5.80	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.10c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c-2.40c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.35c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails (Per pound)	$2.55
Polished fence staples	2.55c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool	$2.70
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh $3.70

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Pacific Coast points	2.60c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
⅜—⅝	68½	60½

Iron

¼	30	13
⅜—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2¼ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 47/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.50
Connellsville, fdry.	5.75 -6.25
Connell. prem. fdry.	6.00- 6.50
New River fdry.	6.50- 6.75
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.§	19.38	....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	....	....	....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	....	23.50	....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	....	23.66	....
Boston from Birmingham	24.12	....	....	....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	....	....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	....	....	....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	....
Cincinnati from Birmingham	23.06	....	22.06	....
Cleveland from Birmingham	23.32	....	22.82	....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	....	....	....
Newark, N. J., from Bethlehem	25.53	26.03	....	....
Philadelphia from Birmingham	24.46	....	23.96	....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.45	25.45	24.95	24.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	....	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $27.50; 6.51-7—$28.00; 7-7.50—$28.50; 7.51-8—$29.00; 8-8.50—$29.50; 8.51-9—$30.00; 9-9.50—$30.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$26.00-$27.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, tide., duty pd. ...$100-110.00
Do., del. Pitts., ..105.33-115.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.. 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent..... 126.00
Spot, $5 a ton higher.

Silicomanganese, 2½ c. 103.00 2% carbon, 108.00; 1%, 118.00 Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 2.00-2.10

Ferrovanadium, 35 to 40%, lb., cont..2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.75c
1% carb.	17.50c	18.25c	18.75c
0.10% carb.	19.50c	20.25c	20.75c
0.20% carb.	18.50c	19.25c	19.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots... $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb..... 1.35
Do, less-ton lots..... 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill.... 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton.$142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots.... 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. .. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots..... 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c

88% chrome, contract... 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots.. 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.93	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.58	3.68	3.68	3.75	3.80	5.42	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	5.10	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.19	....	4.69	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	..
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
*Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.35	4.00	4.00	6.40	3.75	6.50	5.15	....	6.15	10.65	9.80
San Francisco	4.00	4.35	6.00	4.00	4.00	5.60	3.75	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.63	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 or 2000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Nov. 22

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$19.75 5 0 0	$29.82	3 10 0
Basic bessemer	.....	19.59	2 6 0
Hematite, Phos. .03-.05	20.74 5 5 0	.....	.....
Billets	$29.13 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	44.93 11 7 6	57.51	6 15 0
Standard rails	$37.53 9 10 0	$48.99	5 15 0
Merchant bars	1.94c 11 0 0	2.76c	7 5 0
Structural shapes	1.76c 10 0 0	2.61c	6 17 6
Plates, †¼ in. or 5 mm.	1.93c 10 18 9	3.52c	9 5 0
Sheets, black, 24 gage or 0.5 mm	2.29c 13 0 0	3.71c	9 15 0
Sheets, gal., 24 ga., corr.	2.77c 15 15 0	4.66c	12 5 0
Bands and strips	2.16c 12 5 0	2.74c	7 4 0
Plain wire, base	3.43c 19 10 0	3.04c	8 0 0
Galvanized wire, base	4.09c 23 5 0	3.61c to 3.66c	9 10 0 to 9 12 6
Wire nails, base	....	3.52c	9 5 0
Tin plate, box 108 lbs.	$ 6.22 1 11 6	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich §§Mark	
Fdy. pig iron, Si. 2.5	$21.33	5 8 0(a)	$15.15	679.30	$23.10	700	$25.33	63
Basic bess. pig iron	20.05	5 1 6(a)	.....	.....	.....	...	27.94 (b)	69.50
Furnace coke	4.54	1 4 2	5.02	225	7.43	225	7.64	19
Billets	33.08	8 7 6	22.95	1,029	28.38	860	38.79	96.50
Standard rails	1.79c	10 3 0	1.41c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.25c	12 16 0††	1.30c	1,304	1.88c	1,250	1.98c	110
Structural shapes	1.82c	11 8 0††	1.27c	1,268	1.88c	1,250	1.93c	107
Plates, †¼-in. or 5 mm	2.02c	11 10 6††	1.65c	1,650	2.21c	1,475	2.29c	127
Sheets, black	2.84c	16 2 6§	1.96c	1,958‡	2.63	1,750‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.08c	18 12 6	2.85c	2,850	4.05c	2,700	6.66c	370
Plain wire	3.47c	18 0 0	2.00c	2,000	2.48c	1,650	3.11c	173
Bands and strips	2.38c	13 11 0††	1.44c	1,444	1.95c	1,300	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	17.00
Bos. dock No. 1 exp.	17.50
New Eng. del. No. 1	17.25-17.50
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	17.50-18.00
Chicago, No. 1	17.00-17.50
Chicago, auto, no alloy	16.00-16.50
Chicago, No. 2 auto	14.00-14.50
Cincinnati dealers	15.00-15.50
Cleveland, No. 1	19.00-19.50
Cleveland, No. 2	17.50-18.00
Detroit, No. 1	†15.50-16.00
Detroit, No. 2	†14.50-15.00
Eastern Pa., No. 1	20.00-20.50
Eastern Pa., No. 2	18.50-19.00
Federal, Ill.	15.50-16.00
Granite City, R. R.	16.50-17.00
Granite City, No. 2	15.25-15.75
Los Angeles, No. 1	17.00-17.50
Los Angeles, No. 2	16.00-16.50
L. A., No. 1 f.a.s.	18.50-19.50
L. A., No. 2 f.a.s	17.50-18.50
N. Y. dock No. 1 exp.	17.50
Pitts., No. 1 (R. R.)	22.50-23.00
Pittsburgh, No. 1	21.00-21.50
Pittsburgh, No. 2	19.00-19.50
St. Louis, R. R.	17.50-18.00
St. Louis, No. 2	15.25-15.75
San Francisco, No. 1	17.00-17.50
San Francisco, No. 2	16.00-16.50
Seattle, No. 1	14.50-15.50
Toronto, dirs., No. 1	11.25
Valleys, No. 1	20.50-21.00

COMPRESSED SHEETS

Buffalo, new	19.00-19.50
Chicago, factory	16.50-17.00
Chicago, dealers	14.50-15.00
Cincinnati, dealers	14.50-15.00
Cleveland	18.00-18.50
Detroit	†16.50-17.00
E. Pa., new mat	20.00-20.50
E. Pa., old mat.	17.50
Los Angeles	12.00-12.50
Pittsburgh	21.00-21.50
St. Louis	13.50-14.00
San Francisco	14.00-14.50
Valleys	20.00-20.50

BUNDLED SHEETS

Buffalo, No. 1	17.50-18.00
Buffalo, No. 2	15.00-15.50
Cleveland	14.00-14.50
Pittsburgh	19.00-19.50
St. Louis	12.00-12.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	11.50-12.00
Cincinnati dealers	10.00-10.50
Detroit	†11.50-12.00
St. Louis	10.50-11.00
Toronto, dealers	6.75- 7.00

BUSHELING

Buffalo, No. 1	17.50-18.00
Chicago, No. 1	16.00-16.50
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	12.00-12.50
Detroit, No. 1, new	†15.00-15.50
Valleys, new, No. 1	18.75-19.25
Toronto, dealers	5.00- 5.50

MACHINE TURNINGS (Long)

Birmingham	7.50
Buffalo	11.50-12.00
Chicago	10.50-11.00
Cincinnati, dealers	6.50- 7.00
Cleveland, no alloy	11.50-12.00
Detroit	†9.00- 9.50
Eastern Pa.	14.00
Los Angeles	4.00- 5.00
New York	†8.00- 8.50
Pittsburgh	14.00-14.50
St. Louis	7.00- 7.50
San Francisco	5.00
Toronto, delaers	6.00- 6.25
Valleys	12.50-13.00

SHOVELING TURNINGS

Buffalo	14.00-14.50
Cleveland	12.50-13.00
Chicago	10.50-11.00
Chicago, spcl, anal.	12.50-13.00
Detroit	†11.50-12.00
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†6.75- 7.50
Buffalo	11.50-12.00
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Eastern Pa.	12.50-13.00
Detroit	†9.00- 9.50
New York	†8.00- 8.50
Pittsburgh	13.50-14.00
Toronto, dealers	5.50- 6.00

AXLE TURNINGS

Buffalo	17.50-18.00
Boston district	†10.50-11.00
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	16.50-17.00
St. Louis	13.50-14.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†9.50- 9.75
Buffalo	11.50-12.00
Chicago	9.50-10.00
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Detroit	†9.00- 9.50
E. Pa., chemical	14.50-15.00
New York	†8.00- 8.50
St. Louis	7.00- 7.50
Toronto, dealers	5.50- 5.75

RAILROAD SPECIALTIES

Chicago	21.00-21.50

ANGLE BARS—STEEL

Chicago	19.50-20.00
St. Louis	20.50-21.00

SPRINGS

Buffalo	22.00-23.00
Chicago, coil	21.00-21.50
Chicago, leaf	20.50-21.00
Eastern Pa.	26.00-26.50
Pittsburgh	26.00-26.50
St. Louis	20.50-21.00

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	23.50-24.00
Chicago (3 ft.)	20.00-20.50
Chicago (2 ft.)	20.50-21.00
Cincinnati, dealers	21.50-22.00
Detroit	†22.50-23.00
Pitts., 3 ft. and less	26.00-26.50
St. Louis, 2 ft & less	21.00-21.50

STEEL RAILS, SCRAP

Boston district	†15.50-16.00
Buffalo	21.00-21.50
Chicago	17.50-18.00
Cleveland	22.00-22.50
Pittsburgh	22.00-22.50
St. Louis	18.00-18.50
Seattle	18.00-18.50

FROGS, SWITCHES

Chicago	17.00-17.50
St. Louis, cut	18.00-18.50

ARCH BARS, TRANSOMS

St. Louis	20.00-20.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers	12.00-12.50

RAILROAD GRATE BARS

Buffalo	12.50-13.00
Chicago, net	11.00-11.50
Cincinnati, dealers	9.00- 9.50
Eastern Pa.	17.00
New York	†12.50-13.00
St. Louis	13.00-13.50

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	21.50-22.00
St. Louis, No. 1	12.50-13.00
St. Louis, No. 2	16.50-17.00

FORGE FLASHINGS

Boston district	†11.75-12.00
Buffalo	17.50-18.00
Cleveland	17.50-18.00
Detroit	†14.50-15.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	21.50-22.00

LOW PHOSPHORUS

Cleveland, crops	23.50-24.00
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	27.50-28.00

LOW PHOS. PUNCHINGS

Buffalo	20.50-21.00
Chicago	21.00-21.50
Cleveland	20.00-20.50
Eastern Pa.	26.00-26.50
Pittsburgh	25.50-26.00
Seattle	15.00
Detroit	16.50-17.00

RAILS FOR ROLLING
5 feet and over

Birmingham	20.00
Boston	†17.00-17.50
Chicago	20.00-20.50
New York	†18.50-19.00
Eastern Pa.	23.50-24.00
St. Louis	20.00-20.50

STEEL CAR AXLES

Birmingham	20.00-21.00
Boston district	†18.50-19.00
Chicago, net	21.00-21.50
Eastern Pa.	24.50-25.00
St. Louis	22.00-22.50

LOCOMOTIVE TIRES

Chicago (cut)	20.00-20.50
St. Louis, No. 1	17.50-18.00

SHAFTING

Boston district	†18.75-19.00
New York	†18.00-18.50
Eastern Pa.	24.50-25.00
St. Louis, 1¼-3¾".	19.50-20.00

CAR WHEELS

Birmingham	13.50-14.00
Boston dist., iron	†14.00-14.25
Buffalo, steel	21.50-22.00
Chicago, iron	17.50-18.00
Chicago, rolled steel	20.00-20.50
Cincin., iron, deal.	17.50-18.00
Eastern Pa., iron	21.00-21.50
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	21.00-21.50
Pittsburgh, steel	26.00-26.50
St. Louis, iron	20.00-20.50
St. Louis, steel	21.00-21.50

NO. 1 CAST SCRAP

Birmingham	13.00-13.50
Boston, No. 1 mach.	†16.00-16.25
N. Eng. del. No. 2	17.00-17.50
N. Eng. del. textile	18.25-18.75
Buffalo, cupola	18.00-18.50
Buffalo, mach.	19.00-19.50
Chicago, agri. net	14.00-14.50
Chicago, auto net	15.50-16.00
Chicago, railroad net	15.00-15.50
Chicago, mach. net	15.50-16.00
Cincin., mach. deal.	18.50-19.00
Cleveland, mach.	20.00-21.00
Detroit, cupola, net	†16.00-16.50
Eastern Pa., cupola	21.50-22.00
E. Pa., mixed yard	18.00-18.50
Los Angeles	16.00-17.00
Pittsburgh cupola	21.00-21.50
San Francisco	†12.00-13.00
Seattle	16.00-16.50
St. Louis, breakable	15.25-15.75
St. Louis agri. mach.	18.25-18.75
St. L., No. 1 mach.	19.00-19.50
San Francisco	16.00-17.00
Toronto, No. 1, mach., net, dealers	16.00-16.50

HEAVY CAST

Boston dist. break.	†13.50-13.75
New England, del.	15.50-16.00
Buffalo, break	15.50-16.00
Cleveland, break, net	15.25-15.75
Detroit, auto net	†17.00-17.50
Detroit, break.	†14.00-14.50
Eastern Pa.	19.00-19.50
Los Ang., auto, net.	14.50
New York, break	†15.50-16.00
Pittsburgh, break	17.00-17.50

STOVE PLATE

Birmingham	9.00-10.00
Boston district	†12.50
Buffalo	14.00-14.50
Chicago, net	11.00-11.50
Cincinnati, dealers	9.75-10.25
Detroit, net	†10.50-11.00
Eastern Pa.	17.00
New York, fdy.	13.00-13.50
St. Louis	12.00-12.50
Toronto dealers, net	11.00-11.50

MALLEABLE

Birmingham, R. R.	14.00-15.00
New England, del.	20.00-21.00
Buffalo	20.00-20.50
Chicago, R. R.	19.50-20.00
Cincin., agri., deal.	15.00-15.50
Cleveland, rail	23.00-23.50
Eastern Pa., R. R.	21.50-22.00
Los Angeles	12.50
Pittsburgh, rail	23.00-23.50
St. Louis, R. R.	17.00-17.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ %
Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	9.00-10.00

Foreign Ore
(Prices nominal)

Cents per unit, c.i.f. Atlantic

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%	14.00
Chinese wolframite, short ton unit, duty paid	$23.75-25.00
Scheelite, imp.	$25.00-26.00
Newfoundland fdry. 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.00-26.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	50.00-51.00
So. African, 50-52%	50.00-51.00
Indian, 49-50%	nom
Brazilian, 48-52%	50.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Page 80, 81

Pittsburgh—Sheets and strip continue active, orders about matching production and backlogs holding at nearly 12 weeks. Mills still are unable to guarantee deliveries but can give a better approximation of shipping dates than was true recently. Sheet operations generally are at capacity, but it is doubtful if idle, high-cost mills will be brought into service unless higher prices are available in the domestic or export market. Narrow strip output also is at capacity. Deliveries will be complicated further when shipments to Chrysler plants are resumed.

Cleveland—January is the earliest delivery available on new sheet business. First quarter contracting is only moderately active, but renewed buying is looked for when prices are announced. Automotive labor troubles have helped relieve some of the pressure for current shipments.

Boston—Pressure for delivery continues with slight relaxation. Business is close to current capacity production. Buying is for next quarter shipment, and practically full operations are indicated for that period. Fabricators are taking heavy shipments without much increase in inventories. Large price advances have been made in cold strip products made of Swedish steel, $40 a ton in some specialties.

New York—Although there is no future buying that characterized business early in the fall, there is still considerable pressure for shipments. Stove manufacturers are pressing particularly hard and refrigerator makers are far more active than usual at this season. Apparently these consumers are anticipating a heavy holiday trade. Warehouse demand is more active, although there is still a disposition on the part of resellers to hold back until first quarter prices are announced.

Philadelphia—Consumers report inability to obtain heavier gages of galvanized sheets until late March. Lighter gages, however, are available in ten weeks or less. One independent can ship this year, at a higher price. Demand for all grades of sheets is slower, especially for more distant positions. Export demand is fair, with some asking 3.75c, f.a.s. for No. 24 black sheets.

Buffalo—Sheet and strip mills ignored the holiday and rolled at a capacity pace to fill heavy bookings for which customers are asking delivery as soon as possible. Mills report backlogs slow to decline. A tapering is noted in inquiries for next quarter but orders already placed for 1940 delivery are fairly substantial. Motor manufacturers continue to take a large portion of current production.

St. Louis—With exception of automotive releases, pressure for sheet deliveries is more pronounced than at any time since the present upward movement started. Manufacturing demand is apparently expanding, with all principal classifications clamoring for supplies. Despite lack of definite information relative to first quarter prices, orders for that period continue to reach mills in substantial volume. Galvanized sheet and tin plate demand continue outstanding.

Birmingham, Ala.—Movement of sheets continues uninterrupted from mills here and at Gadsden. Operations are close to capacity and demand for both roofing and manufacturers' sheets has shown little recession. Strip is being turned out in fair volume, mostly cotton ties.

Cincinnati—The market is a little quieter. Pressure for delivery,

For Hot, Heavy Work—
STEEL PICKS PENOLA

STEEL men can't afford to skimp on roll neck bearings or reduction gears. With high-friction steel jobs as tough as they are today, it pays to get the *best!*

And to protect this fine, expensive machinery against damaging friction, these same buyers aren't satisfied with merely "adequate" lubricants. They want a margin of *safety*. That's why *they specify Penola!* Then they *know* that those 5000-pounds-per-square-inch pressures won't result in disastrous metal-to-metal contact.

We think it's significant that 80% of the 4-high mills in this country protect such big rolling mill investments with Penola. Penola has been the *heavy* favorite with men who make steel for over half a century.

PENOLA LUBRICANTS

Penola, Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Company)
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

while still heavy, has been lightened somewhat, and the rush to cover first quarter needs has subsided. Tonnage still is being placed for next period, about one-third of the district's capacity already being engaged by orders on hand, it is estimated.

Plates

Plate Prices, Page 80

Cleveland—Plate backlogs have moderated slightly, and the accelerated production rate permits acceptance of some additional tonnage for shipment before the end of the year. Pere Marquette railroad has placed a 406-foot carferry, costing $1,970,000, with Manitowoc Ship Building Corp., Manitowoc, Wis.

Chicago—Plates figure prominently in first quarter bookings, such business at some mills ranking next to flat-rolled and bar demand. Industrial tank work is fairly active and the outlook is favorable.

New York—Demand is stimulated by improved releases from freight car builders who now have schedules arranged and are specifying heavily. Railroads continue good buyers for equipment reparis, and a large tonnage is moving for ship construction and repairs. Oil refinery work involves a fair tonnage but includes no large individual contracts. Export demand is lighter than a month ago, attributed in part to higher prices being asked lately. However, there has been some shading of current levels in an effort to stimulate foreign buying.

Philadelphia—Deliveries have improved, with larger interests now able to take new business in lighter gage universal plates in narrower widths for shipment in ten days to two weeks. Sheared plates are offered in four to six weeks. Several mills continue to quote 2.35c, base. Moderate export business is reported, with prices 2.70c, f.a.s. on tank plates, 2.80c on ship plate. Buyers include Finland, Norway, Holland and South America.

Birmingham, Ala.—Plate mills are exceptionally busy. Orders for railroad plates are being rolled, and tank manufacturers have contracted for considerable tonnage.

Seattle—The market is slack, no large projects pending, but shops report normal seasonal demand for jobs under 100 tons. Lake Washington Shipyards, Seattle, is contructing a fuel oil barge for the Standard Oil Co., and the Commercial Iron Works, Portland, a larger craft of the same type for the Columbia-Snake River Towing Co., both for service between Portland and the Upper Columbia river. Port of Portland is building 86 welded steel pontoons, for dredging operations, contract to Steel Tank & Pipe Co., Portland.

San Francisco—The only plate inquiry of size involves 700 tons for a 24-inch welded steel pipe line for Burbank, Calif., bids on which have just been taken. To date this year 90,326 tons have been placed, compared with 40,082 tons for the same period a year ago.

Plate Contracts Placed

200 tons, snagboat for army engineers, Memphis, Tenn., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, fuel oil barge for upper Columbia river, to Commercial Iron Works, Portland, Oreg.

100 tons, fuel oil barge for Standard Oil Co., to Lake Washington Shipyards, Seattle.

100 tons, 86 welded dredging pontoons for Port of Portland, to Steel Tank & Pipe Co., Portland, Oreg.

Bars

Bar Prices, Page 80

Cleveland—Backlogs of bars are relatively heavier than in other products, delivery not being available in most instances until February. Orders have moderated, pending announcement of first quarter prices, but shipments are sustained in response to heavy demand of consumers and distributors.

Chicago—Sales for first quarter delivery prominently involve carbon and alloy bars, with one mill indicating carbon bar orders are in greater volume than for any other product. At most mills bar sales rank second to flat-rolled orders. Railroad needs for bars for new freight cars substantially support demand. Automobile builders and farm equipment manufacturers are outstanding users, the latter having increased requirements recently and indicating good demand the remainder of the winter season. Other users are maintaining demand in proportion, although bookings recently have been somewhat lighter, because there is no great rush to cover ahead.

Boston—Demand continues brisk, principally for alloy material, with consumers pressing for delivery. Timken Steel & Tube division, Timken Roller Bearing Co., Canton, O., has been awarded by lot 100 tons of chromium-molybdenum bars at 9.47c, delivered, for the Springfield, Mass., armory.

New York—Carbon bar specifications are active, but most sellers note an easing in pressure for places on forward schedules. Buyers are less concerned over ability of mills to provide sufficient tonnage in the future. Railroads, bolt and nut makers and machine tool builders are among the more active buyers. Good demand for special steel continues from government shops.

Philadelphia—Pressure for deliveries continues strong, although new buying for first quarter has eased. Pennsylvania railroad is reported making plans for a second repair program. A consumer of silicon-manganese bars for automobile replacement springs is busy. Export prices have eased, carbon bars being quoted 2.40c, f.a.s., down $6 to $8 per ton.

Birmingham, Ala.—Merchant bars are holding well to the market early in September with production approximately 90 per cent. Implement manufacturers are taking a good part of the output.

Buffalo—Automotive interests are calling for substantial bar tonnages. First quarter buying has subsided somewhat, but producers have fairly heavy bookings for early 1940. Some mills continue to schedule rolling turns seven days a week.

Pipe

Pipe Prices, Page 81

Chicago—Cast iron pipe demand has not shared in recent general business improvement. Government-assisted work has more or less dwindled away, with WPA tonnages rather light. Sellers have had to lean chiefly on private construction, which has not involved significant tonnages lately. Steel pipe has been in better demand than cast iron, with needs of the petroleum industry cited as encouraging.

New York—Approximately 1800 tons of 48-inch steel pipe has been placed with a local seller by the department of water supply, gas and electricity. Merchant pipe enjoyed a little flurry recently, but the trend is seasonally downward. Cast pipe business also reflects seasonal conditions, being more quiet than perhaps at any time this fall. However, New York city, which has been a substantial buyer this year, may again enter the market before the end of the year.

Philadelphia—Oil companies are reported covered three to six months ahead on pipe requirements. A maker of welded pipe for oil country use is operating three days per week.

Birmingham, Ala.—While eased

somewhat, especially in large orders, production of pipe is evenly maintained because of a satisfactory volume of comparatively small lots.

Seattle—Tonnages already placed in 1939 exceed the total for last year. Business has eased and no large projects are scheduled for bidding before January.

San Francisco—No new inquiries for 100 tons or more developed during the week and pending business does not exceed 500 tons. To date this year 35,368 tons have been placed, compared with 29,542 tons for the corresponding period in 1938.

Cast Pipe Placed

185 tons, 16-inch Sand Point project, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

100 tons, 4 and 6-inch for Coulee City, Wash., to H G. Purcell, Seattle, for U. S. Pipe & Foundry Co.

Steel Pipe Pending

100 tons piping for Leavenworth fish ponds, Wash.; bids Dec. 11 to Denver; materials furnished by department.

Unstated, 1 and 1½-inch steel tubing and accessories; bids in at Denver.

Wire

Wire Prices, Page 81

Chicago—Sales of wire and wire products for first quarter delivery are not in great volume as yet, producing interests indicate, although potential demand is decidedly encouraging. Sellers assert there is not much pressure for first quarter placements as consumers have been assured their needs will be taken care of on substantially the same basis as this present quarter. Bookings are expected to proceed more freely when prices are announced. Demand continues strong from automotive parts interests, farm equipment manufacturers, spring and bedspring makers, household appliance manufacturers and numerous miscellaneous novelty and specialty makers.

New York—Deliveries of manufactured wire products are becoming increasingly extended. It appears to be next to impossible to get much under eight to ten weeks; and in the case of wire rods, a much tighter situation prevails. Wire makers also have heavy commitments in merchant products against orders placed early in the fall. New merchant wire demand is off seasonally.

Philadelphia — Shortage of wire rods is reported less acute but wire demand continues strong. Nails are firm.

Birmingham, Ala.—Wire products are moving in gratifying volume. Production is better than 90 per cent, unofficial estimates indicate, and there is little indication of excessive restocking.

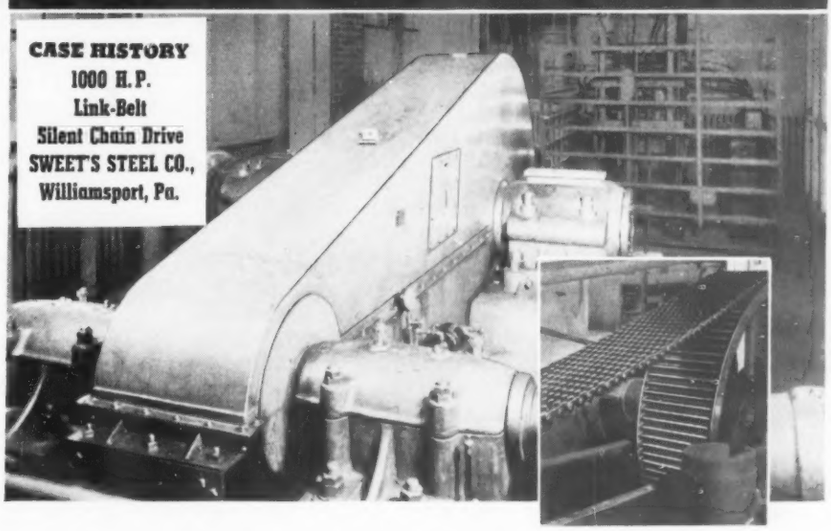
Semifinished Steel

Semifinished Prices, Page 81

Pittsburgh—Although there has been a sharp decline in semifinished bookings this month, shipments to nonintegrated interests have increased. Bookings are running behind deliveries, since needs of the buyers have been adequately covered for the balance of the year and shipping schedules have been set up on most materials. Some buying has been done for first quarter but this is not the general rule. For the most part, smaller mills have been assured their wants will be taken care of and have not bought beyond early needs.

New York—The British government is reported to be closing on orders for 200,000 tons of semifin-

SILENT CHAIN PERFORMANCE FACTS



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• After this enclosed, automatically lubricated Link-Belt silent chain drive had been in service about 14 months, inspection showed that the shop coat of bluing on the sprockets was still conspicuous. Engineered for 1000 h. p., peak loads of 1500 to 1800 h. p. were carried with ease, and the customer reports complete satisfaction with the installation.

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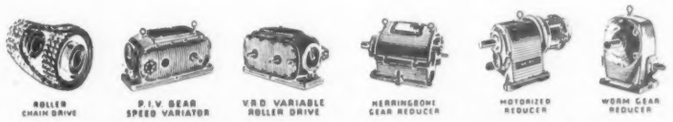


LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

ished steel in this country. Part of the tonnage is said to have been placed the past week.

Rails, Cars

Track Material Prices, Page 81

Pending award of the New York, New Haven & Hartford and the Lehigh Valley lists, involving a total of 750 to 1350 freight cars, car buying over the past fortnight or so has been extremely light, especially as compared with the heavy awards which characterized business in September and October and the first few days of this month.

Locomotive demand has lagged all fall; however, locomotive buying follows car buying as a general rule, and, consequently, there may be a pick up in the purchase of power units a little later.

Recent car buying includes ten 100,000-pound tank cars for the Philadelphia Quartz Co., placed with American Car & Foundry Co. Union Tank Car Co. has been authorized by the interstate commerce commission to construct 100 additional fusion-welded tank cars to be used in service tests for transportation of petroleum products.

Pacific Fruit Express has approved a $10,000,000 program for rebuilding 2500 refrigerator cars and repair of a number of others during first half. Bids will be closed by the navy Nov. 28 on one 50-ton steel flat car and one 50-ton box car.

Canadian Locomotive Co. Ltd. has booked one 2-8-0 type locomotive for the Roberval & Saguenay.

Chicago, Burlington & Quincy has distributed 30,000 tons of rails to Colorado Fuel & Iron Corp., Carnegie-Illinois Steel Corp. and Inland Steel Co.

Rail Orders Placed

Chicago, Burlington & Quincy, 30,000 tons; 12,500 tons each to Carnegie-Illinois Steel Corp., Chicago, and Colorado Fuel & Iron Corp., Denver, 5000 tons to Inland Steel Co., Chicago.

Car Orders Placed

Philadelphia Quartz Co., ten 100,000-pound tank cars, to American Car & Foundry Co., New York.

Buses Booked

J. G. Brill Co., Philadelphia: Twenty-five 44-passenger trackless trolleys for Columbus & Southern Ohio Electric Co., Columbus, O.; twenty-three 43-passenger trackless trolleys for Peoples Railway Co., Dayton, O.

Twin Coach Co., Kent, O.: Sixteen 40-passenger for Steinway Omnibus Corp., Bronx, N. Y.; ten 40-passenger for North Shore Bus Co., Flushing, L. I., N. Y.; ten 27-passenger for Miami Beach Railway Co., Miami Beach, Fla.; four 29-passenger for Belleville-St. Louis Coach Co., Belleville, Ill.; four 28-passenger for National City Lines, Chicago; four 35-passenger for Community Traction Co., Toledo, O.; two 27-passenger and one 25-passenger for Peoples Transport Corp., Muskegon, Mich.; two 27-passenger for South Carolina Power Co., Charleston, S. C.

Shapes

Structural Shape Prices, Page 80

Pittsburgh—Inquiries are declining, but awards are sustained by the large number of pending jobs. Earlier deliveries now are available, and contractors have not been held up to any great extent on this account. Mill schedules are arranged to provide definite shipping dates.

Cleveland — Fabricators continue busy, but inquiries are less active, particularly those for large jobs. Small industrial projects are fairly numerous. Mills now are able to give reasonably prompt delivery on plain material. Backlogs are relatively small and some additions are being made to stocks.

Chicago—Structural orders are only slightly below the October rate, and specifications generally are in excess of current production. Inquiry for fabricated shapes is quieter, most projects being small. One exception is 2600 tons for Illinois highway bridges, bids Dec. 5.

New York — Structural buying is somewhat less active, although some sizable work is reported, including a 615-ton warehouse for the National Sugar Refining Co. in Long Island City. The navy has been a recent buyer, with contracts including, in addition to some local work, a 1550-ton office building in Washington and a 735-ton building extension in Boston, both of these latter orders going to Lehigh Structural Steel Co.

Philadelphia—Business is slower and backlogs of district fabricators are shrinking slightly. However, work already on books will carry most interests through January at capacity. Protections on plain shapes have been extended through March, and fabricators do not look for a first quarter advance.

Seattle—Interest centers in the proposed Washington state Kettle Falls bridge, plans in preparation, bids probably in January, expected to involve 1000 tons or more. Subawards are pending for 412 tons for Washington state bridges in King, Pierce and Snohomish counties. Business pending also includes 750 tons of sheet steel piling for permanent construction at graving dock No. 4, Puget Sound navy yard, and several hundred tons additional for the caisson, depending on type approved.

San Francisco — Interest centers around bids for 1660 tons for a bridge near Redding, Shasta county, Calif., and 360 tons of H columns for a bridge over the Salinas river in Monterey county, Calif., for the state. So far this year 146,520 tons have been placed, compared with 136,981 tons for the same period last year.

Birmingham, Ala.—Demand for structural steel continues to lag somewhat behind other major items. Virtually no backlog obtains in shapes here.

St. Louis—Structural fabricators are buying practically nothing, principal outlets being railroad car and barge building interests. Outlook for the next six to eight weeks is not roseate. Operations and backlogs at fabricating plants have been curtailed further.

Shape Awards Compared

	Tons
Week ended Nov. 25	**24,255**
Week ended Nov. 18	**18,736**
Week ended Nov. 11	**25,105**
This week, 1938	**18,666**
Weekly average, year, 1938	**21,568**
Weekly average, 1939	**22,721**
Weekly average, October ..	**21,730**
Total to date, 1938	**950,421**
Total to date, 1939	**1,067,900**

Includes awards of 100 tons or more.

Shape Contracts Placed

6500 tons, turret shop, Brooklyn navy yard, to Bethlehem Steel Co., Bethlehem, Pa.; bids Nov. 15, steel direct.

5302 tons, including shapes, machinery, sheaves, rope and gridflooring, bridge over Passaic river, Kearny-Newark, N. J., to American Bridge Co., Pittsburgh.

1600 tons, central office and drafting building, Washington, for U. S. navy, to Lehigh Structural Steel Co., Allentown, Pa.

1600 tons, bridge, Glendale boulevard, Los Angeles, for city, to Consolidated Steel Corp.. Los Angeles.

1000 tons, apartment house for Frank Morrell, New York, to Harris Structural Steel Co., New York.

910 tons, state bridges, Orange and Tompkins counties, New York, to American Bridge Co., Pittsburgh, through Lane Construction Co., Meriden, Conn.

750 tons, viaduct, L street, Omaha, Nebr., for state, to Paxton & Vierling Iron Works, Omaha, Nebr.

735 tons, building extension, navy department, Boston, to Lehigh Structural Steel Co., Allentown, Pa.

600 tons, boiler house, Morrell Packing Co., Cedar Rapids, Iowa, to Joseph T. Ryerson & Son Inc., Chicago.

565 tons, machine shop, Texas Co., Port Arthur, Tex., to Petroleum Iron Works Co., Sharon, Pa.

500 tons, East branch Penobscot river bridge, Medway, Me., to Phoenix Bridge

Co., Phoenixville, Pa.; $68,342.84; bids Nov. 22.

333 tons, state highway bridge, Hammon, Okla., to Patterson Steel Co., Tulsa, Okla.

300 tons, steam turbine plant, Rochester Gas & Electric Corp., Rochester, N. Y., to Leach Steel Corp., Rochester, N. Y.

270 tons, extension to building D, for Pepsi Cola Co., Long Island City, N. Y, to American Bridge Co., Pittsburgh.

270 tons, marine corps auditorium, Quantico, Va., to Fort Pitt Bridge Works, Pittsburgh.

250 tons, beam spans, Beaver Dam, Ky., for state, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, state bridge 5523, Robbinsdale, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, addition to forge shop, Mesta Machine Co., Homestead, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, building, Catalytic Development Co., Marcus Hook, Pa., to Belmont Iron Works, Eddystone, Pa.

200 tons, building extension, Acme Steel, Riverdale, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

190 tons, turbine supports, Public Service Electric & Gas Co., Marion, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, warehouse, for Hill Bros. Coffee, Inc., Edgewater, N. J., to unstated fabricator.

170 tons, coal conveyor, United Illuminating Co., Bridgeport, Conn., to New England Iron Works, Inc., New Haven, Conn.

150 tons, state bridge SAP-207-D, Galisteo, N. Mex., to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

150 tons, bridge, FAP-286G, Jefferson county, Wisconsin, to American Bridge Co., Pittsburgh.

120 tons, addition to office building, for Union Central Life Insurance Co., Cincinnati, to Ingalls Iron Works, Birmingham, Ala.

120 tons, building, Producers Milk Co., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

105 tons, storehouses, Laurel, Md., to Dietrich Bros., Baltimore.

105 tons, beam span, Benton county, Iowa, to Clinton Bridge Works, Clinton, Iowa.

105 tons, beam span, Ida county, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

105 tons, bridge, FAS 112A, Racine county, Wisconsin, to Wisconsin Bridge & Iron Co., Milwaukee.

100 tons, Canterbury apartments, Buffalo, to R. S. McMannus Steel Construction Co., Inc., Buffalo.

100 tons, plant addition, Rochester Envelop Co., Rochester, N. Y., to F. L. Heughes & Co., Rochester, N. Y.

100 tons, sewage plant, Duluth, to American Bridge Co., Pittsburgh.

100 tons, state highway project, Essex county, New York, to Fort Pitt Bridge Works, Pittsburgh, through Harrison & Burrows Inc., Jersey City, N. J.

Shape Contracts Pending

5000 tons, appraisers' stores and immigration station, San Francisco, for U. S. government.

3150 tons, high school, Forest Hills, N. Y.; Patsy & Fuhrman Inc., New York, low.

2600 tons, six Illinois state highway bridges, bids Dec. 5.

1500 tons, vocational school, East New York, N. Y.; D. M. W. Contracting Co., Brooklyn, N. Y., low.

1500 tons, Kings Park hospital, New York; Tobias Heller Co., New York, low.

1000 tons or more, Washington state Kettle Falls bridge; bids probably in January.

650 tons, storehouse and shop building, naval air station, Tongue Point, Oreg.

550 tons, filtration plant, Toledo, O., for city.

350 tons, alterations to building, for Straus Building Corp., Chicago.

275 tons, station addition, for Brooklyn Edison Co., Brooklyn, N. Y.

254 tons, Washington state truss bridge, Snohomish county; Rumsey & Co., Seattle, general contractors.

250 tons, state bridge over Shell creek, Cleveland, Fla.

200 tons, apartment house, for Coste Bros., Mt. Lebanon, Pa.

200 tons, electrically operated drawbridge, Falmouth, Mass.; bids Dec. 12.

150 tons, rolled steel armor for lock, Watts Bar dam, Tennessee, for Tennessee Valley authority, Knoxville, Tenn.

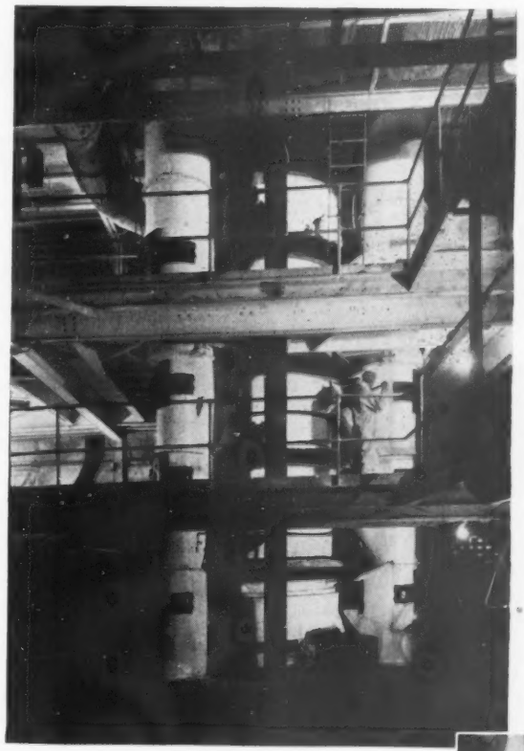
125 tons, overpass MS-39.16, Brooklyn, N. Y., for New York City.

120 tons, stop log guides, specification 1303-D, Coram, Calif., for bureau of reclamation.

103 tons, undercrossing for state at Seattle; Gjarde Construction Co.,

FROM ORE TO METAL

The Story of St. Joe Electro-Thermic Zinc—Number 9 of a Series



VIEW OF ELECTRO-THERMIC FURNACE

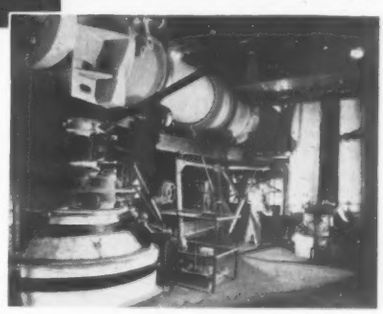
ELECTRO-THERMIC SMELTING

At the zinc smelter of the St. Joseph Lead Company at Josephtown, Pa., the furnace charge, consisting of coke and sintered ore, is fed into a gas-fired brick-lined kiln pre-heater in which the temperature is carried as high as possible without volatization of the zinc. The hot charge is fed into the top of the furnace shaft onto a rotating distributor top.

The electro-thermic furnaces themselves, are quite large affairs, about as high as a four-story building, 37 to 40 feet overall, with an inside diameter of 69 inches. They are of the charge resistor type. The charge, serving as the current carrying medium, rises to a temperature of about 1200° C and becomes incandescent. The zinc vapor formed with the carbon monoxide gas passes through the vapor ring and thence into the condenser.

Approximately 40 tons of charge enters each furnace daily. The carbon electrodes are 12 inches square and 72 inches long, and are spaced 24 feet apart vertically.

The next operation is the condensing of the zinc vapor to produce St. Joe electro-thermic slab zinc.



PRE-HEATER FOR FURNACE CHARGE

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Seattle, general contractor.

Unstated, transmission towers for Bonneville authority; bids at Portland, Dec. 18.

Reinforcing

Reinforcing Bar Prices, Page 81

Pittsburgh—Prices are firm, and demand is good considering the season. Delivery difficulties continue to be encountered, business being ahead of available supplies. Most sellers are quoting high on orders requiring delivery before Jan. 1, because backlogs have created tight schedules until well into first quarter.

Chicago — Projects involving significant tonnages have been lacking recently. A number of jobs are indicated likely to be on the market in the near future, however, and potential tonnage is not thought diminished. An Illinois state highway letting Dec. 5 is expected to involve a noteworthy amount of bars, while a downstate post office and a Detroit housing project also are expected to be in the market for fairly substantial needs.

New York—Light buying is confined mostly to small lots with limited inquiry indicating light buying for December. Prices generally are firm but under pressure from contractors. Shading has not entirely disappeared but is less than a few months ago.

Philadelphia—Few large tonnages are outstanding although a fair volume of small jobs is noted. Prices are firm.

Seattle—Rolling mills have backlogs which will run to the end of the year. While large projects are lacking there is a fair run of small jobs of less than 100 tons each. Awards pending include 260 tons for Washington state road jobs, bids in, and 450 tons additional in bids to be opened later this month.

San Francisco — The reinforcing bar market was the most active one of the week and 3987 tons were placed, bringing the aggregate for the year to 153,889 tons, compared with 138,353 tons for the corresponding period in 1938. Bethlehem Steel Co. was awarded 3230 tons for the bureau of reclamation for delivery at Coram, Calif., and 159 tons for delivery at Sawyer, Wash. Nine ammunition buildings for the navy yard, Mare Island, Calif., were taken by Soule Steel Co. and Truscon Steel Co. secured 288 tons for a housing group at Alcatraz Island, Calif. Pending business is of heavy proportions and exceeds 11,500 tons.

Reinforcing Steel Awards

310 tons, nine ammunition buildings, navy yard, Mare Island, Calif., to Soule Steel Co., San Francisco.

300 tons, Freedmans' hospital, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; George A. Fuller Co., contractor.

288 tons, housing group, Alcatraz Island, Calif., to Truscon Steel Co., San Francisco.

200 tons, plant, Morrell Packing Co., Topeka, Kans., to Sheffield Steel Corp., Kansas City, Mo.; through Pittsburgh-Des Moines Steel Co., Pittsburgh.

160 tons, building for Johnson & Johnson Co., New Brunswick, N. J., to Igoe Bros., New York, through White Construction Co., New York, contractors.

159 tons, bureau of reclamation, invitation 33,895-A, Sawyer, Wash., to Bethlehem Steel Co., Seattle.

130 tons, viaduct, South Western avenue, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; J. McGarry Co., contractor.

100 tons, Middletown Gardens housing, Muncie, Ind., to Truscon Steel Co., Youngstown, O.; J. B. Snyder & Sons, contractor.

100 tons, sub-assembly shop, Portsmouth, Va., to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co.; Ralph Herzog, contractor.

100 tons, riggers' and laborers' shop, navy yard, Charleston, S. C., to Easterby & Murnan, Charlotte, N. C., through Harrison & Wright Co., Charlotte.

Reinforcing Steel Pending

1600 tons, housing project, Bridgeport, Conn.; bids in.

1500 tons, Harrison Gardens housing, Harrison, N. J.

550 tons, tunnel, Williamsburg, Va.

260 tons, cold storage plant, Milwaukee, Wis.

250 tons, ballistic research laboratory, navy, Aberdeen, Md.; Ralph Herzog, Philadelphia, low bidder.

188 tons, Laurel Hill ventilation buildings, Westmoreland county, Pennsylvania; Navarro Corp., low bidder.

177 tons, Sideling Hill ventilation buildings, Fulton county, Pennsylvania; Capitol Construction Co., low bidder.

150 tons, Washington state road projects; Harrison & Co., Tacoma, and Gjarde Construction Co., Seattle, contractors.

142 tons, Leavenworth, Wash., fish ponds for reclamation bureau; bids at Coulee City, Wash., Dec. 11; materials by bureau.

140 tons, dumping platform and ramps for city, New York; P. T. Cox Co. low.

130 tons, building, Engineers' club, Detroit.

115 tons, state highway project, Marietta, O.

110 tons, Washington state truss bridge in Snohomish county; Rumsey & Co., Seattle, general contractor.

110 tons, state highway project 246, Medina and Summit counties, Ohio.

Unstated tonnage, housing project, Detroit.

Unstated tonnage, Illinois state highway lettings; bids Dec. 5.

Concrete Bars Compared

	Tons
Week ended Nov. 25	**1,847**
Week ended Nov. 18	**7,849**
Week ended Nov. 11	**8,712**
This week, 1938	**10,371**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**9,681**
Weekly average, October ..	**10,421**
Total to date, 1938	**317,467**
Total to date, 1939	**455,012**

Includes awards of 100 tons or more.

Pig Iron

Pig Iron Prices, Page 82

Pittsburgh—Pig iron demand is unchanged, with the supply adequate and prices steady. Coke oven operations are holding, but coal production is lighter. It has become apparent that the amount of potential coal business was overestimated in the initial buying rush, and some mines have been shut down lately.

New York — Specifications from machine tool builders are contributing heavily to demand for pig iron. District machine tool builders are operating at a high rate and with further substantial orders coming in, particularly from abroad, their pig iron requirements will likely be well sustained for many months. Soil pipe consumers, on the other hand, are less active. Despite some rumors to the contrary foreign buying of pig iron so far this month has been moderate. Sweden has probably been the most active buyer, but it is thought doubtful if its purchases have excedeed 10,000 to 12,000 tons. At the same time, inquiry is expanding.

Philadelphia — Furnaces are running behind on shipments but no foundry holdups are reported due to shortage of iron. Considerable tonnage booked prior to the last price advance will run well over into first quarter.

Buffalo—Despite a slight letdown in pig iron releases for the holiday week, producers report November specifications equal to October's or slightly heavier. Heavy tonnages remain to be shipped this quarter. Little iron is being stocked by melters, the majority of foundries working five days weekly. Pig iron production holds at 78 per cent, with releases sufficient to absorb output.

Cincinnati—Shipments are steady, and little change is expected in orders until first quarter prices are announced. Deliveries are close to the October rate. Demand for automobile castings is off moderately because of the labor tieup and stove foundries are slightly less busy, but

the melt for machine tools and at jobbing shops is heavier. Foundry coke specifications are steady.

St. Louis—Aside from an active movement of previously engaged tonnage, the market is uneventful. November will be the banner month in shipments this year. Consumption has moved upward in about the same ratio as shipments. New buying is virtually nil, and nothing is expected in this direction until 1940 prices are announced.

Birmingham, Ala.—All 18 of the district's blast furnaces are in production, with sharp gain reported in shipping instructions.

Toronto—In the pig iron market business is attracting comparatively little attention. Melters not covered by contracts to the end of the year are placing orders at frequent intervals and taking delivery in lots of 50 to 300 tons. Steel Co. of Canada Ltd., Hamilton, which withdrew from the market several weeks ago, now is supplying iron to customers in need but is not pushing for new business. It is expected there may be more difficulty in obtaining merchant iron after the turn of the year as producers will require additional tonnage for direct steelmaking. It also is understood that one of the large Ontario producers will blow out one furnace for relining around the first of the year and if this happens the company will be handicapped in supplying the merchant trade.

At present seven blast furnaces are blowing with production about 80 per cent of Canada's pig iron capacity. Prices are firm with no further revision expected until possibly around the middle of next month. While some blast furnace representatives look for advances at that time, others appear doubtful. Current prices follow: Base grade, 2.25 silicon and under, $25.50; malleable, $26; basic, $25.50, Toronto.

Ferroalloys

Ferroalloy Prices, Page 82

New York — Ferromanganese consumers are accumulating some reserve stocks, with the result shipments this month probably will reflect this situation. Deliveries for current needs are heavy. First quarter prices are expected to be announced about the middle of next month; an advance would give further stimulus to December shipments. With most sellers still quoting spot ferromanganese at $100, Atlantic and Gulf ports, it appears little tonnage has been booked at the $10 advance named in some quarters earlier this month.

Scrap

Scrap Prices, Page 84

New York — While most eastern mills are taking scrap shipments against orders buying is light. Prices are softer on a few grades, notably heavy breakable and grate bars, which are off 50 cents. For delivery to district foundries No. 1 machinery cast and No. 2 cast are down a like amount. Some adjustments have been made on unshipped export tonnages held up due to incidents of the war, which are tied up with domestic quotations on a sliding scale. This has resulted in declines of 50 cents to $1 in brokers' prices for barge delivery. Accumulations on barges is substantial in some instances.

British purchase of close to 800,000 tons, including readjusted contracts on about 200,000 tons, is based on a sliding scale of domestic prices. As much as possible is wanted within three months. Italy has bought

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Behind the Scenes with STEEL

Old Friends

■ Some fifty-seven years ago, quietly and without fanfare, two new enterprises saw the light of day. With two different jobs to do for the same industry, each of them has progressed over the years and are this week having an old-time reunion on the front cover of this issue. Sloss-Sheffield and STEEL both proudly date back to 1882, three years before Cowles invented electric furnace reduction and Parsons first produced manganese steel.

Vicious Circle

■ A news item from Omaha, Nebr., tells of scrap dealer R. Firer testifying in Police Court that two men sold him a nice tonnage of scrap metal every day for three weeks, at a price too good to be true. Then, R. Firer discovered, much to his chagrin, that they were stealing the scrap from his own yard each night and selling it back to him the following day. Of course, he was losing money on every sale but making it up because of the volume he did.

Inserts Available

■ If you liked that special insert in STEEL last week analyzing the burden of taxes on American industry, drop us a note. We have some over-runs, suitable for office use, and will be glad to send you a few extra on the house.

Anyway, It's Clean

■ English humor is improving slightly. One of the British mags tells of three hard of hearing gentlemen who were motoring from the North to London in an old jalopy that made a terrific racket. As they were nearing the city, one asked: "Is this Wembly?" "No," replied the second, "this is Thursday." "So am I," put in the third. "Let's stop and have one."

Two Alarm Affair

■ A week or so ago, Walter Kidde & Co. held a big fire fighting demonstration and presentation luncheon at Arrowhead Inn, New York. At the speakers' table were such notables as Boake Carter, Jimmie Doolittle and Raymond Loewy. On the luncheon menu were such intriguing listings as *Fire Water* Cocktails, *Pyromaniac* Potatoes, Peas *a la hydrant,* and *Dri-ice Creme.* From all reports a hot time was had by all.

Copy Chasing

■ Highspots for the week: *Hot Springs for Cold Machines,* Lee Spring Co., p. 9. *Joe, You're Not Looking So Good Lately,* B. F. Sturtevant, p. 69.

Question & Answer Dept.

■ E. R. Barkley (Beaver Pipe Tools Inc.) topped everyone for an ingenious answer to the houses and hoses problem. Simply make that ninth hose long enough to stretch 'round the world and stick it in the back door, he says, and it won't cross any other and although that's silly, it *is* an answer. Incidentally, the train you took last week from either New York or Chicago would pass 47 others before reaching its destination. Another old-timer involves two trains on the same run. One leaves New York for Chicago and travels at a constant speed of 68 miles per hour. At the same time, another leaves Chicago for New York at a constant speed of 59 miles per hour. Which train will be closer to New York when they meet and by how many miles?

SHRDLU

100,000 tons and Japan has closed its usual monthly contracts for substantial tonnage.

Pittsburgh—Leading scrap grades are unchanged but the less popular items continue to weaken. Some interests look for a reversal in the recent price trend as a consequence of continued heavy consumption and limited scrap supplies during the winter.

Chicago — Prices last week were substantially unchanged. Most district mills have bought scrap at prices involving No. 1 heavy melting steel at $17.50. Dealer-broker trading is light, with transactions reported mostly at $17. Brokers are quoting $17 to $17.50 on No. 1 grade. Little substantial mill buying is looked for the balance of the year, mill stocks being quite comfortable at present.

Boston—Sweeping reductions of 50 cents to $1 have been made in scrap prices for both domestic and dock delivery. These include grades for delivery to New England points and affect heavy melting steel and machinery cast grades. Until recently prices had been resisting pressure from consumers for lower levels.

Philadelphia—Purchase of 750,000 to 800,000 tons of scrap by England for delivery over 12 months, mostly in the first three months, has not affected the domestic market pricewise as yet. However, it is at least expected to arrest the declining tendency which had been apparent for several weeks. On the basis of a sale of No. 1 steel at $20 this grade is quoted $20 to $20.50. Cast, machine shop turnings and stove plate are down 50 cents. Shortage of boats for export trade is reported, with one due ten days ago not yet arrived. For this cargo, $18 to $18.25 was paid for No. 2 steel, $19.50 to $19.75 for No. 1.

Buffalo—Prices have an easier tone following general reductions a week ago. New sales are absent to indicate whether the market will level off at current figures. No. 1 steel is $19.50 to $20. Recent weakness is attributed to heavier offerings.

Detroit—The market continues to weaken, a 50-cent reduction being made in practically all grades. One explanation for the decline in scrap is the fact mills generally bought at high prices in anticipation of higher steel prices. With the latter now less likely to advance, mills are reluctant to add to inventories until scrap declines further.

Cincinnati — Prices again have sagged. Quotations on steelmaking grades are off 50 cents and are soft on other items, including cast. Mill buying has lightened, inventories

being adequate for remainder of the year. Dealer offerings are fairly heavy, a factor in price weakness.

St. Louis—The price trend still is downward, reflecting weakness in eastern markets, more liberal offerings, absence of new purchasing and higher inventories at some mills. Reductions range from 25 cents to $1, the largest being on steel specialties. Heavy melting steel is at the lowest level since early September.

Seattle—The market is easing from the high levels based on war expectations. Export volume is not increasing as Japan continues to buy in small lots but in fairly steady commitments, regulated by exchange and import regulations. Heavier receipts from the interior, induced by the recent price rise, have added to the current weakness. Dealers hesitate to quote publicly but state the market is well below the high of a month ago, $17 and $18. Domestic turnover is not active.

Toronto, Ont. — Dealers look for no general price revisions until later in the year when more definite information regarding steel quotations is available. Buying prices on machinery cast have softened, but this has not affected other grades which generally are steady. Scrap is coming into the market freely, some shipments being made to avoid severe weather in later months.

Iron Ore

Iron Ore Prices, Page 84

Cleveland — October consumption of Lake Superior iron ore totaled 5,270,707 gross tons, against 4,184,884 tons in September and 2,780,585 tons a year ago, according to the Lake Superior Iron Ore association. Consumption to Nov. 1 was 33,344,946 tons, compared with 19,512,277 in the 1938 period.

Stocks of ore at furnaces and on Lake Erie docks on Nov. 1 were only slightly larger than a year ago. Comparisons follow:

Iron Ore on Hand

	At Furn.	On Docks	Total
Nov. 1, 1939	33,943,773	5,120,884	39,064,657
Month Ago.	31,203,096	4,650,077	35,853,173
Year Ago. .	33,172,565	5,421,004	38,593,569

Washington—Award of a contract under the strategic materials act for 25,000 long tons of chromium ore to Dorothea Reddy Moroney, San Francisco, at 70.3 cents per long ton unit, has been announced by the procurement division. The ore is to be produced at Seldovia, Alaska, and was quoted f.o.b., U. S. army general depot, New Cumberland, Pa. The contract aggregates $846,000. Previous bids for chromium ore, opened Oct. 20, were rejected, as they did not comply with specifications.

Warehouse

Warehouse Prices, Page 83

Pittsburgh — Demand is heavier than available stocks can accommodate, and warehouses are attempting to get increased allotments from mills. Almost all products are affected. Prices are firm.

Cleveland—Sales generally are holding near the October rate, although further gains have appeared in demand for some products this month, principally specialties.

Chicago — Sales continue active, but November bookings are not expected to top those of October. An upturn in demand is thought likely to be deferred until January.

Philadelphia—November business is running about 5 per cent ahead of October. Total number of orders is holding up well. Warehouse inventories are better balanced, shortages of some grades and sizes having been alleviated.

Buffalo—Demand has leveled off near the peak of the current recovery, and November sales are close to the October level. Increased activtity in heavy products helps to sustain business.

St. Louis—Warehouses report a slight slowing down in orders since late October. Shipping directions, however, are the best so far this year.

Cincinnati — Business holds close

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to the year's peak. Sales of building items are tapering, but sheets, plates and bars are moving actively. Warehouse stocks are in fair condition.

Seattle—Volume of sales is tapering as seasonal demand lags. Bars, light plates and sheets lead but other items are moving slowly. Dealers look for no improvement this year. Prices are unchanged, the Seattle list below Portland on several items.

Steel in Europe

Foreign Steel Prices, Page 83

London—(*By Cable*)—Demand for pig iron for commercial purposes is expanding in Great Britain and supplies are adequate, subject to government license. Additional facilities exist for increased production. Some inquiry is being received for export but no tonnage is available for this purpose. Ore arrivals are irregular but present stocks are sufficient for current needs. Steelworks and rolling mills are operating at capacity, and some export tonnage of finished material is being produced.

Belgium and Luxemburg report demand is slightly less and prices are easier.

Belgian steel production in October rose to 255,000 tons compared with 206,000 in September, 276,000 tons in August and 201,000 tons in October, 1938. French ore deliveries are normal but below maximum requirements, with production stabilized.

Tin Plate

Tin Plate Prices, Page 80

Tin plate production holds at 95 per cent, with backlogs sustained. Little material is indicated as going into stagnant inventories. Canmaking has matched the rise in plate production, and container sales to packers are mounting steadily. Some material has been stocked as a necessary cushion, but ultimate consumer demand has minimized inventory additions by mills, canmakers or packers.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 81

Orders for bolts and nuts are less active, but specifications continue heavy. Releases from freight car builders are increasing, with active demand continuing from the automotive and farm equipment industries. Shipyard requirements constitute an impressive backlog. Bolt and nut production continues heavy, with some makers having difficulties obtaining sufficient raw steel supplies.

Nonferrous Metals

New York—Outstanding development in nonferrous metal markets last week was the drying up of tin offerings and an accompanying rise in prices. Fair to moderate sales were reported in other major markets which maintained a firm price tone.

Copper—Turnover for the week ended Nov. 25 is estimated at about 9000 tons compared with 10,079 tons for the previous week. The decline in sales was due partly to the tightness of spot supplies and partly to observance in many states of the Thanksgiving holiday. Scarcity of spot supplies was reflected in the heavy withdrawals from Commodity Exchange warehouse stocks and in firmness of the resale market at 13.12½c, Connecticut. Producers continued to quote electrolytic at 12.50c.

Lead—Moderate business again was booked in the domestic market with sellers balancing their daily intakes on several days. Prices were firm at 5.35c, East St. Louis. Sentiment in the market was bolstered by release of the bullish statistical report for October, showing a 20,512-ton drop in refined stocks which brought the total down to only 73,963 tons, a new 10-year low. Shipments were the largest recorded in that period at 66,060 tons.

Zinc—Buying interest has tapered due to consumers' well covered position, approach of the inventory period, and possibility of heavier imports of foreign ore. All first hands continued to quote on the basis of 6.50c, East St. Louis, for prime western.

Tin—Dealers here have had difficulty in covering their needs abroad and have been forced to restrict their offerings proportionately. Straits spot closed at 53.50c compared with 51.50c at the end of the previous week. Heavy tonnages are still afloat to this country.

Antimony—Only routine business was booked with prices steady at 14.00c, New York, for American spot in cases and nominally 16.50c, duty paid New York, for Chinese spot.

■ Phoenix Machine Co., Cleveland, has appointed Dowding & Doll Ltd., Greycoat street, Westminster, London, England, distributor for its line of Lester die casting and plastic injection molding machines in Europe.

Nonferrous Metal Prices

Nov.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York *Spot	Straits Tin, New York *Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
18	12.50	12.50	12.75	51.50	47.50	5.50	5.35	6.50	20.00	14.00	35.00
20	12.50	12.50	12.75	51.50	48.25	5.50	5.35	6.50	20.00	14.00	35.00
21	12.50	12.50	12.75	52.50	49.00	5.50	5.35	6.50	20.00	14.00	35.00
22	12.50	12.50	12.75	53.00	49.00	5.50	5.35	6.50	20.00	14.00	35.00
23	Holiday										
24	12.50	12.50	12.75	53.50	51.00	5.50	5.35	6.50	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper

Sheets

Yellow brass (high)	19.06
Copper, hot rolled	20.87
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	11.25

Tubes

High yellow brass	21.81
Seamless copper	21.37

Rods

High yellow brass	15.23
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.31

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.37½-8.50
Cleveland	9.25-9.50
Chicago	8.75-9.00
St. Louis	8.50-8.75

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	10.25-10.50
Chicago, No. 1	10.00-10.25
St. Louis	9.75-10.00

Composition Brass Turnings

New York	8.00-8.25

Light Copper

New York	8.00-8.25
Cleveland	8.25-8.50
Chicago	7.87½-8.12½
St. Louis	7.75-8.00

Light Brass

Cleveland	5.00-5.25
Chicago	5.62½-5.87½
St. Louis	5.00-5.50

Lead

New York	4.85
Cleveland	4.37½-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

Zinc

New York	3.50-3.75
Cleveland	3.25-3.50
St. Louis	3.75-4.00

Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	16.00-16.50
Misc. cast, St. Louis	8.25-8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.75
Standard No. 12 aluminum	15.00-15.25

Activities of Steel Users, Makers

■ STEEL SALES CORP., 129 S. Jefferson street, Chicago, is building a modern two-story office building in conjunction with its warehouse at 3500 South Pulaski road, Chicago. Construction is expected to be completed sometime late next month or the first of the year and the present office will move to the new location then. F. W. Walters recently was made president of the company. He has been with Steel Sales Corp. since its inception some 25 years ago and previous to his new appointment was vice president.

♦

Cleveland Punch & Shear Works Co., Cleveland, plans construction of a one-story addition, to cost about $285,000, including equipment.

♦

Allegheny Ludlum Steel Corp., Pittsburgh, has appointed J. M. Tull Metal & Supply Co. Inc., Atlanta, Ga., its tool steel representative in Georgia.

♦

Forest City Foundries Inc., Cleveland, is adding 10,000 square feet of floor space to its West Twenty-seventh street plant, for the sheet metal department of its furnace division.

♦

John S. Barnes Corp., Rockford, Ill., has established a district sales office at 503 New Center building, Detroit, with Arnold J. Werner in charge.

♦

Theodore L. Dodd & Co., Chicago, has been appointed district sales representative for Buchanan Steel Products Corp., Buchanan, Mich., producer of drop forgings.

♦

Tubular Service Corp., New York, has leased space from the Bissett Steel Co. at 945 East Sixty-seventh street, Cleveland, for a warehouse to serve northern Ohio.

♦

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has appointed Mercantile Metals Inc., Robert M. Moore, president, Grant building, Pittsburgh, its sales agent in the Pittsburgh and Ohio territory for Sloss ferromanganese.

♦

Mechanical Handling Systems Inc., Detroit, manufacturer of conveyors and allied materials handling equipment, announces two new engineering-sales firms to represent it in the East. Wonham Inc., 44 Whitehall street, New York, will cover Connecticut, northern New Jersey and the southern portion of New York state, while Kearney Engineering Co., 2402 Market street, Philadelphia, has been assigned the southern New Jersey, Wilmington, Del., vicinity and eastern Pennsylvania areas.

♦

Oak Mfg. Co., 711 West Lake street, Chicago, maker of radio switches, has purchased Reliance Die & Stamping Co., 1260 Clybourn avenue, Chicago, and will move to the latter location.

♦

Mueller Brass Co., Port Huron, Mich., has opened a Detroit sales office at 1010 Stephenson building, in charge of L. A. Mitchell who has been active the past 15 years with Steel Sales Corp., Detroit, handling Mueller Brass products.

♦

William S. Shipley, president, York Ice Machinery Corp., reports a 42 per cent increase in orders booked in the five-month period from June 1 to Nov. 1 over those of the same period last year. Orders booked totaled $6,501,499, against $4,575,831 last year.

♦

Fox Engineering Co., Jackson, Mich., was incorporated Oct. 1 to succeed the Fox Machine Co., which has been liquidated. All patents, patterns, engineering data and sales records of the Fox Machine Co. have been acquired by the new company.

♦

General Electric Co., Schenectady, N. Y., has been awarded contract for the propelling machinery for a 19,405-ton, all-welded, turbo-electric tanker to be built for Atlantic Refining Co. by the Sun Shipbuilding & Dry Dock Co. at its Chester, Pa., yards.

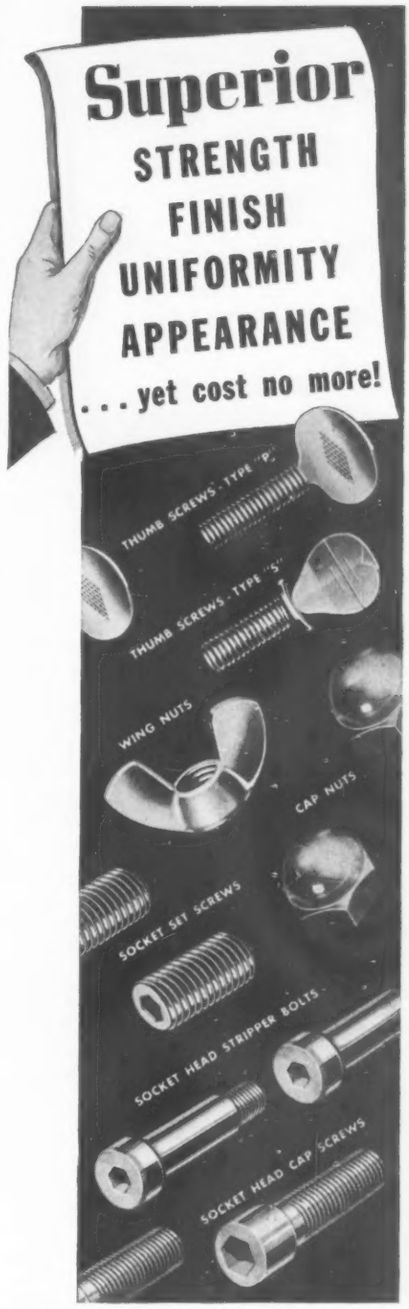
♦

Hydro-Power Systems Inc., Mount Gilead, O., designer and builder of hydraulic machine drives, has established general offices in the Grant building, Pittsburgh, to locate centrally sales and engineering activities, and to facilitate closer working relations with its market.

Extends Price of Aluminum Ingots

■ There will be no advance in Aluminum Co. of America's domestic prices for aluminum ingots during the first quarter of 1940, Roy A. Hunt, president, announced in a statement issued in Pittsburgh last week.

Mr. Hunt said that if rising cost of labor and materials should necessitate a higher price he felt it would be justified, but he does not consider it wise to raise prices merely because of an opportunity to do so.



THE *cold-forging* process developed by Parker-Kalon is the reason why these Parker-Kalon Products excel in so many features. And unequalled production facilities and equipment supply the reason why Parker-Kalon *Cold-forged* Wing Nuts, Cap Nuts, Thumb Screws and Socket Screws cost you no more. Ask for free samples and prices. No obligation, of course. PARKER-KALON CORP., 200 VARICK ST., NEW YORK, N. Y.

PARKER-KALON
Cold-forged
SOCKET SCREWS
WING NUTS · CAP NUTS
THUMB SCREWS
SOLD THROUGH
REPUTABLE DISTRIBUTORS

Few Munitions Orders Placed in Canada

(*Concluded from Page* 16)

the fact that mills now are running at capacity on peace time orders and there is only a limited capacity available to take care of war needs. Because of this, it is believed there will be a heavy overflow of steel orders to the United States, and especially will this be true if Canadian shipyards receive many orders for ships. Demand for plates is expected to be heavy and will be much greater than Canadian capacity. To obtain plates for recent rolling stock contracts, Canadian concerns were forced to turn to the United States for supplies, and some plates were ordered from England.

With sheet mills booked solidly for the remainder of the year, consumers have turned to warehouses and the latter are said to be increasing their imports from the United States. Sheet consumers on this side of the border appear to be showing some anxiety regarding supplies for the future. It is reported one mill refused a contract for its entire output in first quarter.

Building trades are showing more activity, largely due to plant additions necessary to handle expected war contracts. Since the outbreak of war many plants associated with the steel industry have announced plans for new shops or additions, and considerable construction work is underway. This betterment in building trades is reflected in increased demand for structural steel and reinforcing bars and it is stated that approximately 10,000 tons of structural steel is pending, with a like amount of reinforcing bars.

GE Employes Share $4,750,000 Bonus

■ Complying with the general profit sharing plan authorized by stockholders in 1934, and based upon net earnings, General Electric Co., Schenectady, N. Y., announces approximately $2,400,000 will be distributed among employes for the current year. Last year $557,000 was available. In addition employes will have received about $2,350,000 as a cost-of-living adjustment of their earnings, compared to $3,298,000 for 1938. Total additions to regular earnings of eligible employes will amount to $4,750,000, against $3,855,000 a year ago.

For eligible employes, those with five or more years of service, payment for the latter half of this year, to be made about Dec. 20, will be equivalent to 3.75 per cent of their earnings for that period. The additional 2 per cent paid for cost-of-living adjustment will make a 5.75 per cent total to be added to regular pay for the last six months this year. First payment was made in August.

Company employs about 67,000 at present, or 10,000 more than a year ago, according to Gerard Swope, president.

Equipment

New York—Several million dollars worth of machine tool equipment has been placed here over the past fortnight by the French buying commission and France's leading automobile manufacturer. Orders cover a wide variety of machine tools, including millers, grinders, planers, boring machines, lathes, drilling machines, and so forth. Deliveries extend over many months. England has purchased little of late direct. However, there is some continued good Canadian buying.

The United States ordnance department is an active buyer, although domestic commercial requirements have slowed up somewhat due in part to extended deliveries on machine tools. A number of producers are sold well into next summer and in some cases are out of the market until October.

Prices are strong, and in view of extended deliveries, sellers are reserving the right to advance prices on equipment that cannot possibly be delivered within the next eight to 10 months. Buyers, however, will be given 60 days notice of any change. Sellers declare they have no way of knowing what their costs will be several months hence and feel thoroughly justified in taking such protective measures.

Seattle—Public works projects continue to buy freely with pumping, electrical and automotive equipment in best demand. Bids are in to lighthouse department for water plant equipment and steel items at Tongue Point, Oreg. Bids are in to U. S. engineer, Portland, for turbine pump equipment and a quantity of steel wire rope. Orting, Wash., bids Nov. 28 for pumping equipment for treatment plant. Elliott & Co., Ridgeway, Pa., has the contract to furnish motor generator and equipment for the Puget Sound navy graving dock and Westinghouse has the contract for switching gear and control panels.

Construction and Enterprise

Ohio

AKRON, O.—City, W. F. Peters, service director, 103 Municipal building, city hall, contemplates construction of high temperature incineration plant.

BRECKSVILLE, O.—Construction service department, United States veterans administration, L. H. Tripp, 764 Arlington boulevard, Washington, director, is taking bids to 1:30 p.m., Dec. 5, on construction and completion of sewage disposal plant. Certified check 25 per cent to accompany bid.

CINCINNATI—Hudepohl Brewing Co., J. O. Hesselbrock, 40 East McMicken street, general manager, will build bottling plant at cost of $150,000. Nelson, Felsberg & C. H. Gillespie, Ingalls building, architects.

CLEVELAND — City, division of bridges, city hall, is taking bids to Nov. 30 on one heavy duty lathe, one bench grinder, one self-contained swing cut-off saw, one single spindle bolt threading machine, each with motor; four 3-horsepower motors and one 2-horsepower motor.

DAYTON, O.—Contracting officer, materiel division, Wright field, is taking bids until 10 a.m., Dec. 1 on two motor generator sets, 2980 pairs of 9-inch pliers; 10 a.m., Dec. 4, 15,495 adjustable jaw single-end wrenches of various sizes, 2908 multiple series transformers of miscellaneous types, one precision ball bearing bench lathe, one supersensitive drilling machine, one bench type precision milling machine, one press arbor, one bench grinder, 3358 double-end offset screw drivers; 10 a.m., Dec. 5, three electric buffers and polishers, 12 miscellaneous types motor-driven grinders; 10 a.m., Dec. 6, 42,400 files, miscellaneous types and sizes, five drill presses; 10 a.m., Dec. 7, 177 hydraulic jacks of various capacities; 10 a.m., Dec. 8, 200 portable hand punches, ten motor-driven lathes, one automatic screw machine, one wood shaper, one wood-turning lathe, one single surfacer, two double-arbor universal rip and cross-cut saws, one cut-off saw, two band saws, one hollow chisel mortiser, two power presses, one motor-driven sheet metal former.

PORT CLINTON, O.—Village, Fred W. Slauterbeck, mayor, plans construction of sewage disposal plant and sanitary system to cost $350,000. Champe, Finkbeiner & Associates, 725 Nicholas building, Toledo, O., consulting engineers.

TOLEDO, O.—City, J. H. Jewhurst, 110 Cherry street, acting service director, is taking bids due noon, Dec. 6, on equipment for filter plant and reservoir. Greeley & Hanson, Chicago, consulting engineers.

WEST MILTON, O.—Village, Marshall Walker, mayor, plans waterworks improvements, including installation of new water tower, water softening and purification equipment, other improvements and extensions. Specifications to be ready for bids about Dec. 20. Special $30,000 bond issue approved Nov. 7. Collins Wight, Gas & Electric building, Dayton, O., consulting engineer.

WILLSHIRE, O.—Village, E. H. Allspaugh, mayor, plans waterworks system, new 75,000-gallon elevated steel tank; project to cost about $56,000. Owner has filed WPA application. Carl Simon & Associates, Van Wert, O., consulting engineers.

YOUNGSTOWN, O. — Republic Steel

Corp., Republic building, Cleveland, plans installation of heavy duty motors and controls, conveyors, power sub-station equipment, electric hoists and other equipment in new mill here. Work scheduled to start soon. Cost estimated at $300,000.

New Hampshire

CONCORD, N. H. — New Hampshire Electric Co-operative Inc., Phoenix building, 46 West Main street, has $385,000 for 327 miles rural transmission line and generating plant with power equipment. J. R. Worcester & Co., 79 Milk street, Boston, engineers.

New York

CANANDAIGUA, N. Y. — Electric Specialties Inc., Jefferson avenue, plans 1-story, 75 x 110 foot factory, to cost over $40,000. J. C. Rah is engineer.

JAMESTOWN, N. Y.—Swanson Machine Co., L. Swanson, manager, 59 Hopkins avenue, will build a 1-story plant, 66 x 100 feet.

ROCHESTER, N. Y.—Rochester Gas & Electric Co., East avenue, plans construction of generating plant costing $847,-924. E. M. Gilbert Engineering Corp., 412 Washington street, Reading, Pa., engineer.

Pennsylvania

NEVILLE ISLAND, PA.—Vulcan Detinning Co., M. A. Powell, assistant superintendent in charge, will soon let contract on $120,000 factory unit. Private plans.

PITTSBURGH—Calig Steel Barrel Co., H. Calig, representative, 200 South Twenty-First street, plans addition to factory.

SCRANTON, PA.—Scranton Electric Co. has filed plans for new indoor power substation on Olive street, with erection scheduled to start immediately. Cost, including that of equipment, to be over $200,000.

WEST HOMESTEAD, PA.—Mesta Machine Co., L. Iverson, president, is building additions to manufacturing plant.

Michigan

ALBION, MICH.—City contemplates installation of an electric or steam water pump at municipal waterworks plant.

DETROIT—Immerman Screw Products Co. plans erection of small factory building. Louis Cantor Co. has general contract.

GRAND RAPIDS, MICH.—Jarecki Tool & Machine Co. is planning addition to factory building. Robinson, Campau & Crowe, architects.

Illinois

MOLINE, ILL. — Frank Foundries Corp., George D. Frank, manager, plans to rebuild 50 x 80 foot 1-story factory recently destroyed by fire.

Alabama

TALLADEGA, ALA. — Coosa Valley Electric Corp. Inc. has been allotted $290,000 REA loan for rural electric transmission line.

Maryland

BALTIMORE — General Refractories Co., operating plant in Brooklyn, has filed plans and specifications with building bureau for new plant, a raw materials reduction unit, adjoining present works. Structure to be 55 x 102 feet.

District of Columbia

WASHINGTON—Navy department bureau of supplies and accounts will take bids until 10 a.m., Dec. 1 on three motor-driven geared-head engine lathes; 10 a.m., Dec. 5, three motor-driven metal cutting band saws and two combined hand and electric steering engines, complete with spare parts and working plans.

Kentucky

SHELBYVILLE, KY. — Shelby Rural Electric Corp., W. C. Dale, superintendent, has received $67,500 REA loan, will erect 65 miles rural transmission line in Shelby, Henry and Trimble counties. R. W. Chanaberry Inc., 1001-4 Realty building, Louisville, Ky., engineer.

Georgia

BRUNSWICK, GA.—Brunswick Pulp & Paper Co., E. J. Gayner, vice president and general manager, plans $500,000 improvement and addition to factory.

TENNILLE, GA.—Simmons Co., Bainbridge, Ga., is clearing 7-acre site for construction of box and crate factory.

Mississippi

GREENWOOD, MISS.—Delta electric power association has received $172,000 REA loan for rural transmission line.

YAZOO CITY, MISS.—Yazoo valley electric power association has been allotted $84,000 REA loan to finance rural transmission line.

North Carolina

GRAHAM, N. C.—City, J. M. Crawford, mayor, plans waterworks system, including pumping station. A. C. Linberg, Burlington, N C., engineer.

KINSTON, N. C.—City, J. E. Weyler, engineer, will hold special $300,000 bond issue election Dec. 12 for electric light and water system improvements, including installation of steam turbine, generator, condenser, other equipment.

LEXINGTON, N. C.—Davidson Mutual Electric Corp. has $77,000 REA allotment for construction of rural transmission line.

LILESVILLE, N. C.—Town voted $20,-500 bonds for installation of water supply system.

STATESVILLE, N. C.—Carnation Co., Milwaukee, plans to erect milk condensing plant at approximate cost of $200,000.

South Carolina

LAURENS, S. C.—Laurens Electric Cooperative Inc. has been allotted $57,000 REA loan for rural transmission line.

Tennessee

CHATTANOOGA, TENN.—Dave Pavlow, 2508 Vine street, plans to erect packing plant on Chattanooga creek.

FRANKLIN, TENN.—Harpeth Valley Chemical Co., J. H. Kresge, 400 Warner building, Nashville, Tenn., representative, plans construction of phosphate plant; to cost about $125,000.

JELLICO, TENN.—City has approved bond issue for municipal electric distribution system. Jellico power commission, J. H. Cantrell, representative, has $50,000 for project.

MADISON, TENN.—Henry Lux and Joseph Marksley plan rebuilding burned tire plant.

NASHVILLE, TENN.—Fire damage at Gray & Dudley stove plant, 3103 Charlotte avenue, totals $200,000.

NASHVILLE, TENN. — Aviation Mfg. Corp., 420 Lexington avenue, New York, plans installation of power substation equipment, switchgear, motors and controls, electric heat-treating apparatus, electric hoists, conveyors, loaders, other equipment in new aircraft manufacturing plant here. Work to start soon. Total cost of project to be nearly $1,000,000. Albert Kahn Inc., New Center building, Detroit, architect and engineer.

Louisiana

BATON ROUGE, LA.—Ethyl Gasoline Corp. has announced a $4,000,000 plant expansion program here; will increase production 25 per cent; work to begin immediately.

WINNSBORO, LA.—Northeast Louisiana Power Co-operative Inc. has secured $76,000 REA allotment for rural transmission line.

West Virginia

WHEELING, W. VA.—Wheeling Steel Corp. plans installation of motor-generator sets, heavy duty motors and controls, switchgear, regulators, conveyors, electric hoists and other equipment in new butt-weld mill addition to Benwood plant. Will begin work soon; to cost about $1,000,000.

Virginia

CLARENDON, VA.—Brick drying plant of Washington Building Materials Co., Jefferson Davis highway, was destroyed by fire with $100,000 loss.

HARRISONBURG, VA. — Shenandoah valley electric co-operative has secured $76,000 REA allotment for rural electrification program.

Missouri

BETHANY, MO.—City, A. C. Flint, mayor, is completing plans for construction of new water filtration plant and repair of present unit, to cost about $15,000. J. W. Shikles & Co., 708 New York Life building, Kansas City, Mo., consulting engineer.

BOONVILLE, MO.—Co-Mo electric cooperative, Jack Needy, superintendent, has secured $147,000 REA allotment for 142 miles rural transmission line to serve 480 customers in four counties. A. Y. Taylor & Co., Central building, Clayton, Mo., consulting engineer.

FREDERICKTOWN, MO. — Southwestern electrical co-operative will construct 300 miles rural transmission line to serve 1000 subscribers at cost of $300,000. Permit has been granted by Madison county board of supervisors.

WEST PLAINS, MO.—Howell-Oregon Electric Co-operative Inc., L. L. Bryan, president, plans construction of 310 miles rural transmission line in Howell, Oregon counties; has been allotted $322,-000 REA loan for project.

Wisconsin

FENNIMORE, WIS.—City council has voted $70,000 for construction of diesel electric power plant, to be completed by November, 1940. George H. Leiser, Portage, Wis., has been engaged as consulting engineer to draw plans, supervise construction.

OWEN, WIS.—Western Condensery Co.

ADVERTISING PAGES REMOVED

plans construction of addition to boiler plant and installation of additional equipment. G. A. Krasin, Marshfield, Wis., is architect.

Minnesota

BRAHAM, MINN.—P. I. C. K. electric co-operative, Beauford Johnson, superintendent, has been allotted $15,000 REA loan to finance 18 miles rural transmission line serving 69 customers.

LITTLE FALLS, MINN.—Property and disbursing officer, Camp Ripley military reservation, will open bids at 3 p.m., Dec. 5 for construction of a 100,000-gallon elevated steel water storage tank, a 400-gallon per minute turbine pump, electric motor and pressure type iron removal plant.

MINNEAPOLIS—Crowley Fence Co. has started construction of a 1-story addition to factory. E. C. Haley, 2525 Twelfth avenue South, is architect.

MINNEAPOLIS — American Excelsior Corp. has awarded contract for a 1-story factory addition, 34 x 60 feet, to August Cederstrand Co., 966 Central avenue.

MINNEAPOLIS—Griswold Signal Co., manufacturer of street, highway and railroad automatic signal systems, has started construction of factory addition, 26 x 150 feet, 1-story.

MOORHEAD, MINN.—City, R. G. Price, clerk, will add a new turbine and switchboard at its municipal power plant and construct a 1,000,000-gallon surface water storage tank. Total cost estimated at $200,000. Helmick, Edeskity & Lutz, 412 Essex building, Minneapolis, consulting engineers. (Noted Sept. 11.)

ST. PAUL—Masco Electric Products Co. has been incorporated by C. H. Mailand, J. E. Sederholm and Carl P. Mailand to manufacture electrical appliances.

Texas

KAUFMAN, TEX.—Kaufman county electric co-operative has been allotted $125,000 loan to finance construction of 166 miles rural transmission line in four counties.

TAHOKA, TEX.—Lyntegar Electric Co-operative Inc., G. L. Pennington, superintendent, plans 318 miles rural transmission line in seven counties. Association has $246,000 for project.

Kansas

PLEVNA, KANS. — Arkansas valley electric co-operative, Alvia B. Davis, superintendent, has been allotted $102,000 REA fund to finance about 113 miles rural transmission line, serving 275 customers in four counties. A. W. Hefling, 8½ East Second street, Hutchinson, Kans., is consulting engineer.

TOPEKA, KANS.—John Morrell & Co., 201 North Wells street, Chicago, will soon let contracts for construction of 7-story packing plant here. Estimated cost, $500,000. Henschien, Evards & Crombie, 59 East Van Buren street, Chicago, architects, will let contracts.

Nebraska

GERING, NEBR.—Chimney Rock public power district has filed application with state railway commission for authority to construct 33 miles rural transmission lines in Morrill county.

HEBRON, NEBR. — Thayer county rural public power district has filed application with state railway commission for authority to construct 178½ miles rural transmission lines in Thayer county.

KEARNEY, NEBR.—City, Harriette J. Nelson, clerk, is making a survey on construction of a sewage disposal plant. Douglas McKnight, Lincoln, Nebr., supervisor.

LINCOLN, NEBR.—Chris Kuhner has applied to city council for permission to construct an oil refining plant.

TEKAMAH, NEBR.—Burt county rural public power district, Alex Peters, president, has filed application with state railway commission for authority to construct 16 miles of rural transmission line in Burt county. H. H. Henningson, 1904 Farnam street, Omaha, Nebr., consulting engineer.

Iowa

CHEROKEE, IOWA—Howell & Wadsley Mfg. Co. has been incorporated to manufacture pump jacks and other devices. Fred Wadsley is president and Harry B. Howell secretary-treasurer.

DUBUQUE, IOWA — City plans construction of sewage disposal plant.

GREENFIELD, IOWA—Town council, C. L. Downing, clerk, will take bids until 1:30 p.m., Dec. 12 on improvements to municipal power and light plant. Stanley Engineering Co., Muscatine, Iowa, engineer.

MARSHALLTOWN, IOWA—Marshalltown Mfg. Co. has started erection of 1-story foundry addition, 30 x 60 feet, to be operated by Acme Brass & Aluminum Foundry. John Swab is manager.

Colorado

DELTA, COLO.—Delta-Montrose rural power lines association, Donald S. Mitchell, superintendent, has been allotted $50,000 REA loan for about 24 miles rural transmission lines.

FT. MORGAN, COLO.—Morgan county rural electric association, O. S. More, superintendent, has secured $25,000 REA loan to finance 18 miles transmission line to connect with United States bureau of reclamation system.

GREELEY, COLO.—John C. Nixon, representative and secretary of new electric power and light co-operative being formed, has been granted $230,000 REA loan to finance 219 miles of rural transmission line in Weld and Larimer counties.

Montana

BILLINGS, MONT.—St. Paul Stockyards Co. plans construction of packing plant, has purchased land for site. Billings Commercial club also is interested in project.

Idaho

KELLOGG, IDAHO—Bunker Hill & Sullivan Mining Co. is building a dry ore reduction plant, installing electrolytic process for treatment of antimony ore.

Utah

PANGUITCH, UTAH—Garkane Power Co. Inc., R. A. Middleton, superintendent, has $137,000 for 109 miles rural transmission line in Kane, Garfield counties.

New Mexico

CARLSBAD, N. MEX. — International Agricultural Corp., New York, plans installation of power substation equipment, switchgear, motors and controls, conveyors, electric hoists, loaders, other equipment in new potash mining and milling plants. Total cost of project estimated at nearly $2,000,000. Union Potash & Chemical Co., Carlsbad, an affiliated interest, to be in charge of project.

Pacific Coast

COMPTON, CALIF.—Fred B. Cannon and Frank G. Cannon, 1464 East Compton boulevard, have been issued certificate to conduct business under the firm name of Allen Machine & Motor Works.

LOS ANGELES—Larry C. Brightwell, 1046 South Olive street, has been granted permission to conduct business under firm name of Cast Iron Soil Pipe Manufacturers' Institute.

LOS ANGELES — Curtiss Anti-Vapor Pumps Inc. has been formed by L. K. Askew, Lawton Williams and Charles R. Curtiss. J. Harold Decker, Fidelity building, represents the new corporation.

LOS ANGELES — Precision Bearings Inc., 1706 South Grand avenue, a Delaware corporation, has been organized with $45,000 capital stock. Joseph C. Cannon, Securities building, is California representative.

LOS ANGELES—Alexander Tool Co. has been incorporated with 5000 shares no par stock. William Alexander, A. F. Muter, Bessie Jones are directors. A. L. Abrahams, 636 South Spring street, corporation's attorney.

SAN DIEGO, CALIF.—Certificate to transact business under firm name of San Diego Iron & Wire Works has been issued to John Walter Bannister, 903 University avenue, owner.

DEER PARK, WASH.—Blue Grouse Tungsten Inc., capital $100,000, has been organized by B. R. Moyes and associates.

EVERETT, WASH. — Everett Pulp & Paper Co. plans installation of motors and controls, conveyors, other equipment in new addition to local mill. Cost estimated at $200,000; work to be started soon.

BREMERTON, WASH.—City has been allocated $170,317 WPA fund for proposed municipal water system improvements, including chlorinator.

Canada

CALGARY, ALTA.—Imperial Oil Ltd., R. V. LeSueur, vice president, 56 Church street, Toronto, Ont., plans $100,000 plant improvement. Private plans.

VANCOUVER, B. C.—Vancouver Rayon Silks Ltd. will take bids soon on first unit of rayon silk plant at North Vancouver to cost $500,000. Ultimate cost of project to be about $2,500,000.

SIDNEY, N. S.—Dominion Steel & Coal Corp. Ltd. contemplates constructing addition to steel plant. Private plans; to cost about $100,000.

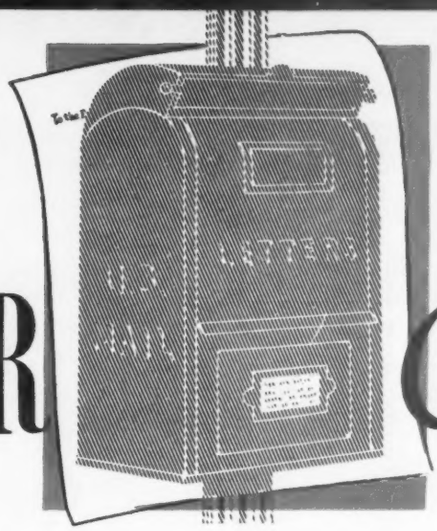
LEASIDE, ONT.—Toronto Hydroelectric System, 14 Carlton street, has purchased site for erection of power substation to cost about $50,000.

PORT ARTHUR, ONT. — Collingwood Shipbuilding Co. Ltd. plans $50,000 addition to plant.

THOROLD, ONT.—Walker Bros. Co. is taking bids on one elevator bucket loader, mounted on caterpillar traction, also water pump with motor, 3-inch discharge.

TORONTO, ONT.—Toronto Iron Works Ltd., 629 Eastern avenue, plans a 1-story and basement, 60 x 160 foot plant. H. G. Duerr, 910 Lumsden building, architect.

READER Comments



Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

War Lesson Well Learned

To the Editor:

That the burned child dreads the fire is exemplified in the present business situation as related to the war in Europe. Fortunately for business in the United States the interval since the World war is so short that memories of scorched fingers are still vivid and mistakes of that period are being avoided almost universally, to the greater safety of the industrial structure.

It is heartening to hear the statements of leaders that war business is not good business and domestic needs are to be served first. The same spirit seems to be pervading the entire business world and when possibilities of expanded plant to meet heavy demands are presented they are scanned critically and seldom adopted.

While some small profits doubtless are being lost, the greater gain in stable conditions will far offset this. On every hand are signs of conservatism and sane thinking that will bear fruit in better conditions for years to come.

The same spirit seems to control in the minds of leaders in the warring nations. Great Britain is proceeding slowly in expanding war industry in Canada, (STEEL, Nov. 27, p. 16), though that dominion is its greatest potential source of war supplies.

Much the same reaction from World war excesses hurt industry in Canada as in the United States and the government is holding back its contracts until more light is shed on the probabilities of a long struggle.

Those of us who have been through the troubles incident to readjustment from war conditions in the past 20 years are glad to see the general attitude against expansion, which we know would have a backlash doing far more damage than the war profits could do good. We seem to be living in a saner world and the situation is being considered with coolness instead of the hysteria that prevailed in the 'teen years.

Let us hope subsequent events will not change this attitude and lead to repetition of the former situation.

STEELMAKER

Pittsburgh

Workers Understand Better

To the Editor:

My fellow workmen have called me a "company" man, and sometimes less complimentary things, because I have been able to see the boss' point of view and have realized that he has been trying to do the best he can for himself and for us workers. But in recent years more and more workers have dropped the attitude of severe criticism of the company's efforts, especially of labor-saving machinery.

One reason for this is the campaign of education carried on by a large number of companies, in bulletins, in plant publications and by lessons filtering down through the foremen.

These thoughts came to me on reading of the letters to employes by Revere Copper & Brass (STEEL, Nov. 27, p. 23). I think workers, who, after all, are fairly reasonable in the main, have had wrong ideas about modernized plants and these methods of telling them the truth are bearing fruit. I can see results in our own shop, following a moderate effort to show advantages of labor saving equipment.

MACHINIST

Cleveland

Steel Replacing Timber

To the Editor:

That steel and concrete are used in the floating pontoon bridge across Lake Washington at Seattle, (STEEL, Nov. 27, p. 29), seems rather remarkable when it is considered that timber is one of the principal industries of the state of Washington. The visitor from the East is struck by the use of lumber for many purposes where steel or other metals are almost universally utilized in other parts of the country.

Steel and concrete must be impressing themselves on the minds of the coast engineers when they are adapted to a floating structure for which timber would naturally be considered first, especially in a region producing it in profusion.

Pontoon bridges have been used since antiquity but probably few have been of other than timber construction and it is doubtful if they have been as large in any dimension as the Seattle structure. Naturally the earlier bridges must have been less permanent and less stable and designed for much lighter traffic loads.

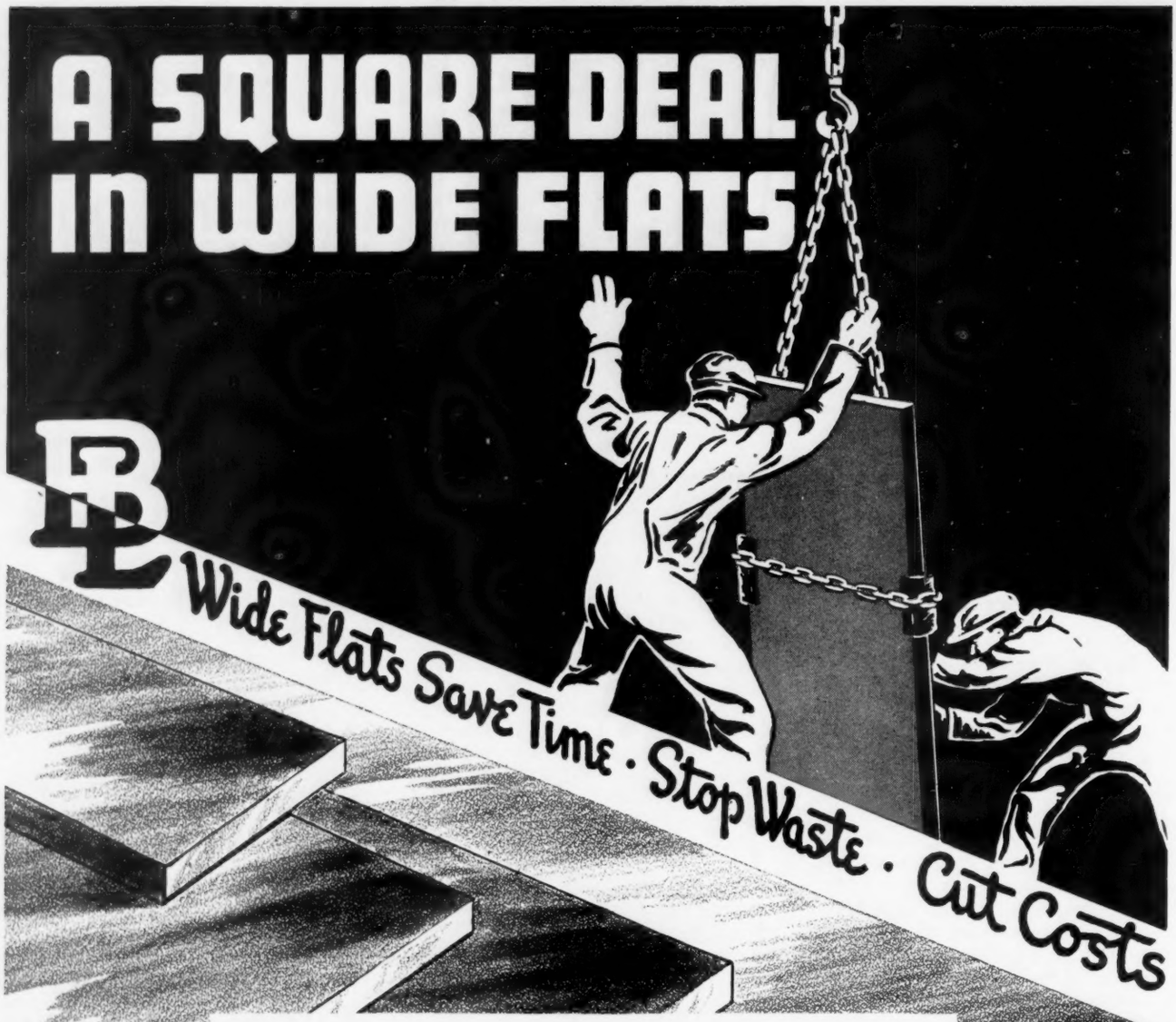
Lake Washington is a fairly large body of fresh water of great depth, connected with Puget Sound's salt water by canals and locks, which maintain its level fairly uniformly. Landlocked, it is not subject to as much wave action as the open Sound and this makes the pontoon idea practicable where depth forbade pier construction except at heavy expense.

Increasingly universal use of steel is indicated by this invasion of the stronghold of the lumber industry, a further chapter in the forward march of modern materials.

TRAVELER

Cleveland

A SQUARE DEAL IN WIDE FLATS



B & L Wide Flats Save Time · Stop Waste · Cut Costs

THE careful selection of quality steel and the rigid maintenance of high manufacturing standards have won a *square deal* reputation for B & L Wide Flats among steel users everywhere.

What production men like about these convenient Cold Drawn Sections is the assurance of

Square, sharp corner development
Smooth, blemish-free surfaces
True straightness and flatness
Close tolerances on all dimensions

It is this typical B & L accuracy and fine workmanship that makes for maximum economy in the use of these handy sections for bed plates, machine mountings and backings for dies, jigs and fixtures.

A wide range of sizes is available, eliminating unnecessary machine work. Standard Flats come: ⅛" x 3/16" to 3" x 6"; Extra Wide flats: ¼" to 2" thickness, and 6" to 12" in width. Analysis SAE 1020 or SAE X-1020, as standard; other grades also available.

Ask your distributor—or write for details.

COLD DRAWN BARS • GROUND SHAFTING • SCREW STOCK • LEADED STEELS • SPECIAL SECTIONS • ALLOY STEELS

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.